THE IRON TRADE REVIEW

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Tremendous Consumption is Steadily Maintained

And Increase in Buying of Pig Iron is Probable—Mills Have Difficulty in Satisfying Customers—Furnace Coke is Firmer

Steady maintenance of tremendous consumption of iron and steel products strengthens the hope that highly prosperous conditions will continue throughout the year. Weakness which developed in some spots during the past few weeks is not more pronounced and the general sentiment of the market is stronger. Heavy buying by large consumers of finished materials, such as the agricultural implement manufacturers, who are already in the market, is confidently expected to increase largely the volume of orders on the books of the mills, many of which are in very comfortable condition, while some are so filled that they cannot promise deliveries in less than six months.

Mill Activity

Many mills report that they are unable to satisfy the insistent demands of customers for prompt deliveries. In the Chicago district, the pressure is especially strong. Numerous makers of plates, shapes and bars in different districts report bookings in excess of shipments, while in other lines there is no decrease in new business. Shortage of cars in the Chicago district has caused some delays in making shipments. It is estimated that a quarter of a million tons of fabricating steel are now pending in the market in the country.

Pig Iron

Careful observers believe that if the present heavy melt of pig iron is maintained for a few weeks longer, a heavy buying movement will set in and the present weakness of the pig iron market will quickly disappear. This seems to be a reasonable expectation, but, on the other hand, the market shows a decided tendency to soften with very little provocation. Low prices continue to be made on Cleveland iron for shipment outside of the city up to July 1, as low as $16.25, furnace, having been named on No. 2 foundry for shipment to a not far distant point. The resumption of one furnace in the valley had a depressing effect on the market and indicated how easily prices could be affected. The blowing in of two or three more furnaces in the valley and Cleveland districts would cause still further recession of prices, which could be checked only by heavy buying. In the Pittsburgh district, inquiries for basic amount to about 25,000 tons, including one for 15,000 tons for second, third and last quarters of the year. Sales of No. 2 foundry have been made at $17, valley, but some makers are adhering to $17.50 as their minimum quotation. There is apparently more resale iron at present in southern Ohio than in the south. Pig iron stocks controlled by furnaces in the south have increased recently, but it is believed that speculative stocks have been reduced. A leading seller in the south, who has been holding at $13.25, Birmingham, for No. 2, reports sales of about 10,000 tons. It has developed that the recent sale of 40,000 tons of pig iron at Buffalo was of hot metal, to be delivered from Susquehanna furnaces to the Lackawanna Steel Co. A Delaware river pipe maker is figuring on 15,000 tons of low grade iron for delivery prior to July 1.

Coke

The downward tendency of furnace coke prices seems to be checked. Foundry coke, which has resisted the softening tendency of furnace fuel, is now showing some indications of weakness. Ovens in the Connellsville region broke all records for production for the week ending Feb. 15, the output being 433,411 tons.

Nuts and Bolts

Recent cutting of prices on nuts and bolts seems to have been confined largely to jobbers and possibly a few of the smaller manufacturers. In the Cleveland district, nut and bolt manufacturers are not able to give deliveries in less than three months and report that business is unusually active for this time of the year. Similar conditions prevail at Pittsburgh and other manufacturing centers.

Railroad Buying

It is estimated that 50,000 cars have been ordered since Jan. 1, and pending inquiries include several lots of from 2,000 to 6,000 cars. The Boston & Maine has increased its inquiry to 6,000 cars. The supplemental order of the Pennsylvania for 2,300 cars, requiring 46,100 tons of steel, makes the total recent orders of the Pennsylvania 12,305 cars of various kinds. There is a fair amount of rail buying in lots of moderate size. The International & Great Northern has ordered 13,000 tons. The Illinois Steel Co. has taken 6,000 tons from a number of lines. Several orders of good size for railway bridge material have been taken in western territory.

FURNACE ACTIVITY

Will Increase in the East—Stacks Which Will Resume.

A number of changes in the operations of eastern merchant furnaces have recently been made or are scheduled to take place in the near future. The net result of these changes will be a considerable increase in active capacity over the present rate. The Marshall furnace at Newport, Pa., has gone out but this loss is replaced by the Musconetcong stack, Stanhope, N. J., which blew in the past week after an idleness of several years. The Delaware river furnace, Chester, Pa., will go in shortly, after being out several weeks for improvements, which include the addition of a new stove and other betterments. One of the Worth furnaces at Coatesville, now relining, will be ready for the blast in a few weeks. While operated by a steel maker, the Worth furnaces are partially merchant, for when both stacks are going, some of their output is offered in the open market. One of the Warwick furnaces, Pottstown, Pa., which has been running upon foundry, is changing to low phosphorus. The Thomas Iron Co. is considering the putting in of another stack.

Will Build at Sandwich

The province of Ontario has granted a charter to the Canadian Alkali Co., Ltd., for the establishment of a plant at Sandwich, Ont., and as soon as practicable work will be started on a site in close proximity to the land of the proposed new plant of the United States Steel Corporation. The Canadian Alkali Co., Ltd., is to have a capital stock of $2,000,000. With one exception the men heading the new industry are Detroit capitalists, the officers being: President, Jas. Inglis; vice president, William McBain, of Toronto; treasurer, M. G. Borgman, and secretary and general manager, H. S. Dodson. These with A. L. Stephens form the board of directors.

The company has acquired a large acreage and will develop immense salt beds which are said to underlie its property and scientifically treat the products by a chemical process patented by Howard M. Dubois, a chemical engineer of experience. The products will include sodium chloride, or chemically pure salt, caustic soda or lye, and chloride of lime. Mr. Dubois was formerly associated with the Wyandotte plant of the Pennsylvania Salt Co. The company will open offices in Windsor and in Detroit and all of its buildings will be of latest form of construction representing what is known as the "daylight" type.

END STRIKE

At Plant of A. O. Smith Co., Milwaukee.

Milwaukee, Feb. 25.—The A. O. Smith Co.'s first strike, called on Wednesday, Feb. 19, by 150 men employed in the drill press department, subsequently involving about 800 men, was officially ended yesterday morning, when every striker returned to work, thus putting the big automobile frame and parts factory back on normal production.

It develops that the strike was caused by a misunderstanding of the purposes of the company in making a readjustment of the premium rates and a dislike by the workmen of a new foreman who was employed several weeks ago to supervise this readjustment. The change was designed to better compensate the higher classes of labor, and while some of the lower classes of labor suffered a slight reduction, the general average of wage was as good or slightly better than before.

The A. O. Smith Co. employs approximately 1,600 men and has been operating 22 hours per day for some time. The concern manufactures pressed steel automobile and truck frames, front and rear axles, clutches, transmissions, gears, springs and roller, ball and plain bearings. It is stated that the walkout caused an interruption amounting to less than one full working day, and that deliveries are being made according to specifications.

Will Not Merge

In connection with the efforts which have recently been made to form a consolidation of certain sheet and tin plate plants in the Pittsburgh territory, THE IRON TRADE REVIEW is officially advised by the Phillips Sheet & Tin Plate Co., having mills at Weirton, W. Va., Clarksburg, W. Va., and Steubenville, O., that there is no intention on the part of that company to merge its interests with others.

The MacKinnon Boiler & Machine Co., Bay City, Mich., plans to more than double capacity when new shops are erected on a site already secured.

ANNUAL REPORT

Of Nova Scotia Steel & Coal Co., Made Public.

The annual meeting of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., was held at Montreal, Que., Feb. 21. The directors' report stated that during the first nine months of the year, conditions were similar to those prevailing in 1911, when owing to the dumping of American iron and steel products on the Canadian market, profits were seriously reduced. It was not till late in the year that the demand in the United States gave the American manufacturers a market at home for their products, and until then low prices prevailed in Canada.

The profits for the year were $1,000,609, as compared with $1,019,392 for 1911. The sum of $452,600 remains to the credit of the profit and loss account. The amount expended during the year on capital account was $1,279,569.

With the increased revenue expected from larger sales of ore, higher prices obtained from other products, and the earnings from the new plant installed during the past few years, the directors are of the opinion that 1913 will show a considerable increase in earnings over any previous year.

The opening of a new colliery at the Sydney mines, and additions to the plant and equipment at Wabana are under consideration, and funds to meet the contemplated expenditure will be raised by a further issue of debenture stock.

It is expected that the plant of the Eastern Car Co. at New Glasgow, which was organized as a subsidiary company, will be in operation by August, and it will be a large user of the finished products of the Nova Scotia Steel & Coal Co. and an additional source of revenue.

Running Almost Full

The Pennsylvania Steel Co. has blown in its Lochiel furnace, Steelton, Pa., and now has all its blast furnace capacity in operation, including five stacks at Steelton and two at Lebanon. The Maryland Steel Co. has three furnaces active and one idle at Sparrows Point. The one idle furnace of the combined Pennsylvania and Maryland groups is being rebuilt and will be ready for the blast in the near future.

RYAN'S RE-ELECTION

Considered Probable by Delegates to Convention.

Indianapolis, Feb. 26. (By wire.)—Frank M. Ryan, president of the International Association of Bridge and Structural Iron Workers, is presiding over the eleventh annual convention of the organization, which opened here Monday. Many others, who were convicted in the dynamiting cases, and who are also out on bond, are in attendance. The sessions are being held in secret and will continue for 10 days, the election of officers to take place on the last day. The attendance is unusually small, 56 delegates attending the opening session, which number has increased to about 70.

There is a general impression among the delegates that if Ryan will accept he will be re-elected, but he declines to make any statement. Although no other candidates have announced themselves for the place, Joseph E. McClory, now acting secretary, is also mentioned for the position. Samuel Gompers, president of the American Federation of Labor, will address the convention later in the week.

RAILROAD BUYING

Continues Actively — Recent Orders For Steel Rails.

New York, Feb. 26.—Railroad buying of steel materials continues heavy. Street railway companies have been especially active for track work, girders and tie rails. The Lorain Steel Co. is already heavily sold up on its capacity. Car buying goes on steadily and it is authoritatively stated total car orders since Jan. 1 have reached about 50,000.

Standard rail buying is good in smaller lots. The International & Great Northern has closed for 13,000 tons. The Illinois Steel Co. reports 6,000 tons from a number of lines; the largest order being 2,000. Railroad bridge work is quite active, particularly in the west. The Milwaukee Bridge Co. has 1,200 tons for the St. Paul and the American Bridge Co. 1,400 for the Southern Pacific, 1,200 for the Burlington and 1,100 for the Soo Line.

Mines Building Burned

A fire recently destroyed the School of Mines building at the University of Minnesota. Practically all of the equipment of the mining department is a total loss. The loss on the building is said to be $90,000. The ore crushing and testing plants adjacent to the main building were uninjured. The regents of the University plan to ask the legislature for an appropriation of $325,000 for a new School of Mines building. The burned structure will also be rebuilt and turned over to the department of education.

BETTER TONE

In Pittsburgh Scrap Market—Furnace Coke Appears Firmer.

Pittsburgh, Feb. 26. (By wire.)—A somewhat better tone is reflected by iron and steel scrap market. Some of the heaviest consumers are opening negotiations for heavy melting stock and it is understood that dealers will hold firmly to prevailing price, $14.50. Machine shop turnings, however, continue to show weakness.

The Pittsburgh & Lake Erie railroad has sent out inquiries asking bids on about 30 machine tools, which probably will be installed in the shops at McKees Rocks, Pa. The list is not being circulated generally. Bids will close March 1.

Although conditions continue quiet, prompt furnace coke appears firmer and dealers are refusing to shade $2.50 a ton at the ovens. More talk about sales at $2.60 and $2.65 is heard, but it is impossible to verify such reports. Foundry coke is quiet and has not declined to any great extent, and the contract market for both grades is quiet.

MORE BLAST FURNACES

Will be Built by Steel Corporation at Chicago and Lorain.

New York, Feb. 26. (By wire.)—The United States Steel Corporation is considering the material enlargement of its blast furnace capacity in the Chicago district and also at Lorain, O. At both of these plants, when steel works and finishing mills are running full, difficulty is encountered in obtaining sufficient pig metal. No decision has yet been reached as to the number of furnaces to be added.

National Tube Co. Buys Billets

New York, Feb. 26. (By wire.)—The National Tube Co. has purchased 8,000 tons of special billets to meet shortages in own make. It is understood the steel will come from a maker in the Pittsburgh district.

CHEERING REPORTS

Come From Mills—Car Shortage Causes Delays.

New York, Feb. 26. (By wire.)—Reports from all branches of the finished steel industry are most favorable and show that the demand of consumers for future material is becoming even more insistent in not a few directions. Mills continue wholly unable to meet wants of buyers as they need material. In the Chicago district, pressure upon mills is especially severe and there seems to be a place for every possible ton of material that can be squeezed out of plants there. Implement manufacturers have begun to enter the market for steel bar requirements for next season running from July through the last half and even first half of next year. This is considerably earlier than usual. Other buyers are endeavoring to extend contracts further and further ahead. Some of the largest makers of the country whose lines are chiefly plates, shapes and bars, report new bookings heavily in excess of shipments. In tubular goods, sheets, tin plate, wire products and other products highly satisfactory reports of heavy shipments and strong new demand are uniform. Shortage of cars, particularly in the Chicago district, has been interfering somewhat with steel shipments there.

There is a shortage of plates and shapes on the Pacific coast and there also continues a heavy demand for these lines for Canada. Estimated pending tonnage of fabricated steel now in the market from all sources is about 250,000 tons.

VERY DOUBTFUL

Whether Sheet and Tin Plate Plants Will be Merged.

New York, Feb. 26. (By wire.)—Continued inability of promoters and some of the companies to come to terms has rendered it doubtful whether the proposed merger of independent sheet and tin plate plants in the Pittsburgh district and La Belle Iron Works will be successful. According to well-informed circles, the recent announcement of one independent tin plate maker that it would be party to no combination is taken to signify in many quarters that the general plan is likely to fall through.

Fred Chandler, Bethlehem, Pa., has been appointed assistant superintendent of the Bethlehem Steel Co.'s foundries.

PITTSBURGH

Specifications Extremely Heavy

Office of THE IRON TRADE REVIEW, 2148-49 Oliver Bldg., Feb. 25.

The iron and steel market continues strong, and there appears to be no immediate cause for worry. Specifications against contracts last week were as heavy as they have been at any time during the present period of prosperous conditions; this is especially true in reference to plates, shapes, bars, sheets, tin plate, rails and shafting. The wire market is quiet, and specifying in some instances has not been heavy, but the general tone is strong. Pig iron is in better demand, but lower quotations have come out as a result of a prolonged period of quiet and inactivity. Furnace coke is stronger than it was a week ago and quotations are firmer. Not much demand for coke is reported, however. The scrap market continues to lag and prices are at low ebb, but better prospects are in view. One maker of iron bars has advanced quotations $1 a ton, but manufacturers, as a rule, continue to offer this product at 1.70c to 1.80c.

Pig Iron.—Better prospects are in view for an active buying movement. About 25,000 tons of basic pig iron are involved in pending transactions and there is more demand for Bessemer, foundry and gray forge than has been the case for several weeks. The N. & G. Taylor Co. has opened negotiations for 5,000 tons of basic for second half shipment to its plant at Cumberland, Md.; one of the local steel companies has stated that it will buy 15,000 tons for second, third and fourth quarter consumption; the Colonial Steel Co., which bought 1,500 tons of basic a couple of weeks ago, has not yet closed for 4,500 tons to be shipped in April, May and June, and the American Steel Foundries is in the market for 2,000 tons of basic for prompt delivery.

Reports to the effect that basic can be obtained at $16.25, valley, were indirectly responsible for increased demand. Foundry iron is selling at a wide range. Several consumers have been offered iron at $17, and it is understood that a couple of sales have been closed at that figure. On the other hand, it is known that small tonnages continue to bring $17.50. Competitive bidding would bring out the minimum figure without much difficulty, it is believed. Negotiations have been opened for a couple of 500-ton lots of gray forge, although no sales have been made for some time. Although slightly lower quotations characterize the pig iron market, conditions are not weak. Exceedingly little tonnage is being sold, and just as soon as active buying begins, many in the trade expect to see prices stiffen. We quote as follows for first half delivery:

(First Half.)

Bessemer, valley	$17.25 to17.50
Basic, Pittsburgh	17.25
Bessemer, Pittsburgh	18.15 to 18.40
Basic, valley	16.35
No. 2 foundry, valley	17.00 to 17.50
Malleable, valley	17.00 to 17.25
Malleable, Pittsburgh	17.90 to 18.15
No. 2 foundry, Pittsburgh	17.90 to 18.40
Gray forge, valley	16.25 to 16.50
Gray forge, Pittsburgh	17.15 to 17.40

Ferro-Alloys.—The market for ferro-alloys, like that for some lines of finished steel products, is quiet. Heaviest consumers covered requirements before the close of last year, and there has been little or no buying recently. Ferro-manganese for both prompt and forward delivery is quoted at $65, seaboard, although it is rumored that an occasional sale is made slightly less than this figure for prompt delivery.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, and lower grades are quoted at a spread of $1, No. 12 per cent being listed at a range from $25 to $26, although the maximum figure represents the price at which the majority of dealers are quoting. Talk of slightly lower priced ferro-titanium was heard a short time ago, but it is impossible to trace sales at less than eight cents per pound for carload lots.

We quote 80 per cent ferro-manganese at $65, Baltimore, for prompt delivery and $65 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $26, 11 to 12 per cent, $25, 10 to 11 per cent, $24; 9 to 10 per cent, $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Car buying has not been so heavy the last couple of weeks, and not many inquiries of size are pending. A quiet period is to be expected after the unusual activity experienced the early part of the year. One in close touch with the car buying situation estimates that more than 50,000 cars of miscellaneous type have been purchased since Jan. 1. The Baltimore & Ohio is said to be figuring on 5,000 or more cars, and it is stated in some quarters that the Pennsylvania railroad will buy additional passenger coaches. It develops that the contract taken by Booth & Flynn, this city, for the Passaic Valley sewer, Newark, N. J., involves only 2,400 tons of tunnel segments. No. 10 gage steel plates, stiffened with angles will be used. Initial reports said that 18,000 tons of riveted steel plates would be involved. The Pittsburgh company was awarded the contract for one section of the sewer, 2,000 feet long, and bids for other sections now are being advertised. The sub-contract for plates has not yet been awarded by Booth & Flynn. Specifications against contracts continue to exceed mill tonnages, and the following prices are decidedly firm:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.60c for forward shipment and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—Specifications against contracts continue at a heavy rate, and makers report that February will equal the preceding month from a standpoint of specifications and shipments. All serviceable mills in this district are operating at full capacity, although the scarcity of semi-finished steel does not enable mills to produce as much as desired. Mill tonnages do not equal specifications and deliveries are badly deferred.

Premium prices continue to be paid on material to be delivered in the near future. Premiums range from $1 to $3 a ton, and mills in a position to make anything like prompt delivery advise that demand continues just as active as it has been the last couple of months. The following prices are being firmly maintained:

Flat Sheets

Black Sheets.—Nos. 10-12 gage, $2 per 100 pounds; Nos. 13-14 gage, $2.05; Nos. 15-16 gage, $2.10; Nos. 17-21 gage, $2.15; Nos. 22-24 gage, $2.20; Nos. 25-26 gage, $2.25; No. 27 gage, $2.30; No. 28 gage, $2.35; No. 29 gage, $2.40; No. 30 gage, $2.50.

Tin mill sizes, Nos. 15-16 gage, $2.10 per 100 pounds; Nos. 17-21 gage, $2.15; Nos. 22-

24 gage, $2.20; Nos. 25-27 gage, $2.25; No. 28 gage, $2.30; Nos. 29-30 gage, $2.35; Nos. 30¼-31 gage, $2.40; No. 32 gage, $2.45.

Blue Annealed.—Nos. 3-8, $1.70 per 100 pounds; Nos. 9-10, $1.75; Nos. 11-12, $1.80; Nos. 13-14, $1.85; Nos. 15-16, $1.95.

Galvanized.

Nos. 10-11 gage, $2.50 per 100 pounds; Nos. 12-14 gage, $2.60; Nos. 15-16 gage, $2.75; Nos. 17-21 gage, $2.90; Nos. 22-24 gage, $3.05; Nos. 25-26 gage, $3.20; No. 27 gage, $3.35; No. 28 gage, $3.50; No. 29 gage, $3.65; No. 30 gage, $3.80.

Roofing Sheets

Net extras on all gages per 100 pounds.

Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage, inc., 15c.

Tin Plate.—Despite reports to the contrary, nothing definite has been done in reference to the proposed merger of several independent tin plate mills in this district, and no new developments are expected until after stockholders of La Belle Iron Works, Steubenville, O., meet, March 11, to consider the giving of an option to New York financiers. The Phillips Sheet & Tin Plate Co. announces that it will not enter the proposed consolidation.

Tin plate continues to be quoted at $3.60 for base size tins, and there is no indication of any immediate change in the prevailing price. Heaviest consumers have covered requirements through their respective seasons and specifications are coming in at a heavy rate. All serviceable tin plate mills are operating at maximum capacity, and some makers have been able to catch up considerably in deliveries. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material. — Mills rolling rails in this district advise that specifications this year are at an excess of those for the corresponding period in 1912, and it is not at all improbable that the present month will equal, and possibly exceed January, a particularly good month in this branch of the trade. Leading consumers throughout the country covered 1913 needs before the close of last year, but there has been considerable new buying. Light rails continue to be in good demand and heavy shipments are being made to the mining and lumber camp interests. Traction line interests are covering needs somewhat more actively than was the case a fortnight ago.

Standard railroad spikes are quoted at 1.90c and 2c is being asked for smaller sizes. No particularly large orders for spikes have been placed this month, but specifying has been at a heavy rate. Jobbers' stocks are in much better condition than they were before the end of the year. Middlemen are maintaining the regular prices. Rails are quoted as follows, with the base price of open hearth steel sections at 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carload and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes

4½, 5 and 5½ and 9-16	1.90c
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—The scarcity of billets and sheet bars continues, and it is not at all improbable that conditions will not improve, despite the fact that the open-hearth steel capacity will be greatly increased during the next six or eight months. There were 50 new open-hearth steel furnaces completed or under construction at the beginning of the year, but the majority of these will not be making steel until July 1, and a large number of them will not be put into operation until fall. So far as sales are concerned, the semi-finished steel market is quiet, although frequent rumors of transactions being closed are heard. The prevailing quotations are more or less nominal on account of the infrequency of sales, but the following prices represent the market as accurately as possible:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $29.00, with the usual rolling billets, $29.50. Bessemer sheet and tin bars are quoted at $29.50 and open-hearth sheet bars are quoted $30, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $36, Pittsburgh.

Hoops and Bands.—The leading interest is not selling hoops and bands beyond July 1, although it is understood that several independent mills are selling products beyond that date. New buying is practically at a standstill, although specifications against contracts have not fallen off. In fact, some makers advise that specifications this week have been heavier than those of the preceding week. Hoops are quoted at 1.60c and bands at 1.40c.

Hoops in carload lots, 1.60c to 1.70c, Pittsburgh, in less than carload lots, 1.65c to 1.75c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—One of the makers of iron bars in this district, on Monday, announced that the 1.70c quotations had been withdrawn and that the minimum quotation has been advanced $1 a ton. This particular interest is now quoting at a range from 1.75c to 1.80c, and is able to make deliveries all the way from a week to two months. Several other manufacturers advise that they have not changed prices, and continue to quote at a spread from 1.70c to 1.80c and these figures continue to represent the market for iron bars. Demand continues fairly strong and specifying has been liberal. Although some of the independent manufacturers are selling steel bars through the entire year at 1.40c, the Carnegie Steel Co. is not offering this product for delivery after July 1. Manufacturers of shafting advise that demand last week was surprisingly heavy, and specifications exceeded those of the preceding week by a considerable margin. Jobbers have been able to accumulate fairly large stocks, but none of them is shading the prices that went into effect several weeks ago. Cold rolled shafting is quoted at 58 per cent off for carload lots and 53 per cent off for less than carload lots. Prices are:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 58 per cent off in carloads and 53 per cent in less than carloads delivered in base territory.

Bolts Nuts, and Rivets.—Prices of nuts and bolts in this district are being firmly maintained, although it is understood that jobbers in eastern Pennsylvania, and in some of the New England states, have been shading prices during the last week or ten days. Just before the close of the year, these jobbers specified to the full extent of contracts, and are now able to offer material somewhat below the prevailing prices. The market in Cleveland, it is understood, compares favorably with the local market, although conditions at Chicago are about the same as those in the east. Rivets remain unchanged in price. Quotations follow:

Rivets

Button head structural rivets, 2.20c, cone head boiler rivets, 2.30c. Small rivets 75, 10 and 10 off.

Bolt and Nut Discounts.

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts,

$5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅜-inch and larger, $6.60 off; ½-inch and smaller, $7.20 off.

Structural Shapes.—Fabricators have experienced a rather quiet week, although conditions continue strong. A number of interesting projects have been considered in this and adjacent districts, including the Bloomfield bridge, this city, plans for the superstructure of which have not yet been completed. A double track bridge across the Ohio river, connecting Metropolis, Ill., and Paducah, Ky., to serve principal railroads of the Mississippi Valley, has been proposed, although no definite information has been given out.

The Jones & Laughlin Steel Co. has received a contract for 200 tons for an office building for the City Furniture Co., Altoona, Pa., and the McClintic-Marshall Construction Co. will build and furnish the steel, 75 tons, for a hot nut shop, 70 x 140 feet, for the Columbus Bolt Works, Columbus, O. Revised plans for the Pennsylvania Rubber Co.'s new plant at Jeannette, Pa., are expected to be issued shortly. Fabricators have enough tonnage on their books to assure maximum operation through six months, and prices are being maintained in every instance. We quote as follows:

Standard structural shapes, 1.45c to 1.60c for forward shipment. For extras see card of Sept. 1, 1909.

Iron and Steel Pipe.—Although no particularly large inquiries are out, a rather heavy tonnage of iron and steel pipe is involved in pending transactions. Mills continue to receive scattering orders for tubing, casing and line pipe, which represent fairly heavy tonnages in the aggregate. Pipe makers are enjoying one of the best years in the history of the trade. They have not yet been able to catch up in deliveries, and considerable complaint continues to be heard regarding deferred shipments. Iron and steel pipe are quoted as follows, discounts being subject to the usual preferential discounts to the large buyer:

Iron and Steel Pipe Basing Prices

STEEL.

	Black. Butt.	Galv. Butt.	Black. Lap.	Galv. Lap.
⅛, ¼ and ⅜ inch..	73	52½	..	..
½ inch	77	66½	..	..
¼ to 3 inch	80	71½	..	..
2 inch	..	..	77	68½
2½ to 6 inch	..	..	79	70½
7 to 12 inch	..	..	76	65½
13 to 15 inch	..	..	53	..

Extra Strong Plain Ends, Card Weight.

⅛, ¼ and ⅜ inch..	68	57½	..	..
½ inch	73	66½	..	..
¾ to 1½ inch	77	70½	..	..
2 to 3 inch	78	71½	..	....
2 inch	..	..	74	65½
2½ to 4 inch	..	..	76	67½
4½ to 6 inch	..	..	75	66½
7 to 8 inch	..	..	68	57½
9 to 12 inch	..	..	63	52½

Double Extra Strong Plain Ends, Card Weight.

½ inch	63	56½	..	..
¾ to 1½ inch	66	59½	..	..
2 to 2½ inch	68	61½	..	..
2 inch	..	..	64	57½
2½ to 4 inch	..	..	66	59½
4½ to 6 inch	..	..	65	58½
7 to 8 inch	..	..	58	47½

IRON.

⅛ inch	66	47	..	..
¼ inch	70	57	..	..
¾ to 2½ inch	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch	..	..	71	62
7 to 12 inch	..	..	69	56

Extra Strong Plain Ends, Card Weight.

⅛ inch	64	53	..	..
¼ inch	68	61	..	..
¾ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch	..	..	71	62
4½ to 6 inch	..	..	70	61
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48

Double Extra Strong Plain Ends, Card Weight.

½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..
2 and 2½ inch	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch	..	..	61	55
4½ to 6 inch	..	..	60	54
7 and 8 inch	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—There is an unusually heavy demand for boiler tubes, and all of the manufacturers in this district are receiving liberal specifications. Locomotive boiler tubes in particular have been in demand. Iron boiler tubes have not been advanced, although many in the trade have expected for a week or ten days that new discounts would be put out.

IRON AND STEEL BOILER TUBES BASING PRICES.

(To Jobbers.)

	Steel.	Iron.
1¾ to 2 inch	60	48
2¼ inch	57	44
2½ and 2¾ inch	63	53
3 and 3¼ inch	68	55
3½ to 4½ inch	70	58
5 and 6 inch	63	..
7 to 13 inch	60	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—The wire market is quiet, and wire products are not experiencing the activity enjoyed by some other lines. This is ascribed to the fact that consumers bought heavily in the fall, and have not yet had to enter the market for spring material. Specifications continue heavy, but are not to the full extent of contracts in all instances. There has not been much new buying, although, when new contracts are taken, they are based upon prices prevailing today, which appear to be firm. There does not seem to be any foundation to recent reports to the effect that wire products were to be advanced in the near future. We quote as follows:

Wire nails, jobbers' carload lots, $1.75, retailers' carload lots, $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.55; and to dealers, in carloads, $1.60; polished staples, $1.75; galvanized staples, $2.15.

Wire Rods.—No sales of wire rods are reported. We quote both Bessemer and open hearth wire rods at $30, Pittsburgh.

Coke.—The market is quiet, but prices are somewhat better and much firmer than they were a week ago. Furnace coke is being held at $2.50, ovens, and talk of $2.65 fuel is heard in the Uniontown district. Dealers have offered second half fuel at a range between $2.50 and $2.75, ovens, which indicates that the $3, oven, price probably will not rule, as some expected. Foundry fuel, which has held up decidedly well in the face of an inevitable slump, is beginning to reflect some weakness, and rumors of $3.25 72-hour fuel are heard. All of the bargain counter coke seems to have disappeared. Ovens in the upper and lower Connellsville regions broke all previous records the week ending Feb. 15, according to the *Connellsville Courier*. Figures indicate that 433,411 tons were produced, as against 410,443 tons the week before. Shipments made a net increase of 871 cars. We quote this week as follows:

Connellsville furnace	$2.50
Connellsville furnace contract	2.50 to 2.75
Connellsville foundry	3.50
Connellsville foundry contract	3.50 to 3.75

Old Material.—Quiet continues to characterize the market for iron and steel scrap. Despite the fact that prices are $1 and $1.50 a ton less than they were several months ago, there does not appear to be any demand of consequence. Dealers are unable to sell material at minimum prices, and mills show no inclination to purchase additional material. Although heavy melting steel has been nominally quoted at $14.25, dealers state that they would not sell a large quantity of this stock at less than $15 and one of the mills reports that it paid $14.50 a few days ago for a rather small tonnage of good quality steel.

We quote as follows for delivery in the Pittsburgh district:

Heavy melting scrap	$14.25 to 14.50
Rerolling rails	16.50 to 17.00
Malleable	14.00 to 14.50
Agricultural malleable	12.75 to 13.00
Bundled sheet scrap	12.00 to 12.25
Iron axles	26.00 to 26.50
Old iron rails	16.25 to 16.50
Stove plate	11.00 to 11.50
No. 1 wrought scrap	15.25 to 15.50
Old car wheels	16.00 to 16.50
Low phosphorus	18.00 to 18.25
Machine shop turnings	9.75 to 10.00
No. 1 busheling	14.00 to 14.50
Country mixed	10.75 to 11.00
Cast borings	13.25 to 10.50
No. 1 cast scrap	14.75 to 15.00

CHICAGO

More Activity in Pig Iron

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Feb. 25.

Although reports from various sections of the country seem to indicate that there is a greater activity in Chicago than elsewhere in finished lines, Chicago producers are still receiving inquiries from eastern buyers. As these inquiries call for comparatively prompt delivery, however, the western mills are unable to consider them except at very high premiums. Mill reports for the past week show that specifications are still considerably in excess of shipments and in some cases it appears that the total received for the current month will break all previous records. One producer of bar iron reports a greater volume of business on its books than at any previous time in its history. In spite of the continued mill congestion, few projects are being held up for lack of material other than those requiring large tonnages of structural shapes.

Pig Iron.—In spite of the fact that the market remains very quiet, there are some indications of activity greater than has been perceptible for some weeks. Inquiries are more numerous particularly for second half, but this indication must be discounted considerably, as many of those sent out have proved to be purely of a tentative nature. It is understood that Vermillion Malleable Iron Co. has withdrawn its recent inquiry calling for from 500 to 1,000 tons of malleable for last half delivery. Other requirements, however, have appeared, including an inquiry from the Baker Mfg. Co., Evansville, Wis., for 600 tons of foundry iron and an inquiry for like tonnage is reported from a consumer near Peoria. The Mississippi Valley Stove Works has recently purchased a small tonnage and an Illinois consumer has taken 500 tons of southern iron for first half delivery. A sale of 500 tons of basic is noted, taken by an Illinois consumer at current quotations. Numerous car load lots of southern iron have been sold on a basis of $14, Birmingham, this figure appearing to be the going quotation from that market. It is understood, however, that very little furnace iron has been sold on this basis, the largest interest still adhering closely to $14.50, Birmingham. A number of Tennessee stacks still have quotations on a basis of $13.50, Birmingham, but on account of the difficulty in conforming to the analysis called for in recent inquiries, no material tonnage of this iron has been placed.

Although misfit northern iron can still be had at $17.50, furnaces, or lower, the local producers are not disposed to sell standard cars on a contract basis at less than $18. The northern market, however, has a ragged appearance owing to the fact that off grade iron has been purchased at low prices to be used in place of No. 2 foundry.

Buyers in general are still playing a waiting game in regard to their second quarter requirements. It is probable that the larger part of this tonnage will not be covered until some time during the coming month. Consumers still manifest a keen interest in second half prices, but thus far no business has resulted.

The following prices represent the market for Chicago delivery except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces.

Lake Superior charcoal	$18.00 to 19.25
Northern foundry No. 2	17.50 to 18.00
Southern foundry No. 2	17.85 to 18.35
South'n Silveries, 5 per cent sil.	19.85
Jackson co. silveries 8 per cent	21.40
Malleable Bessemer	17.50 to 18.00
Alabama basic	18.85

Merchant Bars.—There appears to be no diminution in the volume of specifications for soft steel bars, and while the period for delivery on bar iron seems about the same, mill congestion is apparent in a greater degree. One local producer recently took a good tonnage of steel bars for March rolling at 1.85c, Chicago, or $4 a ton above current quotations. Although the producers are now able to secure re-rolling rails in satisfactory quantities and on much better terms, there is no indication of weakness in hard steel bars, all available tonnage being absorbed readily.

We quote, f. o. b. Chicago, as follows:

Bar iron 1.60c to 1.62½c; hard steel bars, rerolled, 1.65c to 1.75c; soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 58 per cent off list for carload lots, 53 per cent off for less than carloads.

On iron and steel bars from local stock we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.50c, full extras.

Structural Material.—The continuance of congested conditions in the market for shapes throughout the remainder of the year seems inevitable, in spite of frequently expressed hopes to the contrary on the part of both producers and consumers. An increasingly large number of small contracts are being filled from store. Although there is some shortage in jobbers' supplies at present, the warehouses hope to enter May with full stocks of all sizes. The structural contracts let during the past week amount to 3,551 tons, a considerable decrease as compared with the previous week. Of this total, the American Bridge Co. has taken 104 tons from the Great Western Railway Co. for deck plate girders, 246 tons from the Oliver Iron Mining Co. for shaft set stuttles and bearer beams for "C" shaft, East Norrie mine, Ironwood, Mich. The same fabricator has also taken 190 tons from the Minneapolis, St. Paul & Sault Ste. Marie Railway Co. for deck plate girder spans. The Chicago, Milwaukee & St. Paul Railway Co. has let a contract for 1,200 tons of structural shapes for various bridges to the Milwaukee Bridge Co., and a contract let for 896 tons of girder span plates by the Minneapolis, St. Paul & Sault Ste. Marie has been taken by the Wisconsin Bridge & Iron Co. and the Chicago Bridge Co. The S. H. Kress Co. has let 915 tons for the construction of an office building at Houston, Tex. It will be noted that this week, as well as in the past, a large part of the tonnage covered by structural contracts is for railway construction of various kinds. The activity of western roads is affecting the market for structural material in a degree almost equal to its effect on plates and rails.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over

6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—It is even more certain western railroads will require greater tonnages of both rails and track fastenings during spring and summer, and inquiry covering them has already appeared. Rail mills in this territory already have sufficient business on their books to keep them in operation during the greater part of 1913. Specifications for track fastenings are keeping up at the previous rate and considerable difficulty is being experienced in placing new business. Prices are very firm at current quotations.

We quote light rails, f. o. b. Chicago, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard stection relaying rails, subject to inspection.

Track fastenings, f. o. b. Joliet, are as follows:

Angle bars, 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c, base; track bolts with square nuts, 2.30c to 2.40c.

Plates.—While decreased activity in car buying has been noted during the past week, it carried with it no promise of relief to the mills, as heavy business is pending. Specifications from sources other than car builders are very heavy and many consumers complain that deliveries are not made with any degree of promptness and that it is impossible to place new business without paying high premiums. It is estimated that all of the mills in this territory, including those of the independents, are now full up to the last quarter of the year. This takes into consideration the new mill of the Inland Steel Co., which is now under construction. The Norfolk & Western is negotiating for an additional 2,000 freight cars and the Utah railway, Salt Lake City, Utah, is figuring on 500 coal cars. The Toledo, St. Louis & Western is considering the purchase of 1,000 box cars.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—The market for rivets continues somewhat easier and that for bolts and nuts is practically unchanged. Although deliveries are being postponed in some instances, in general they can still be made in from four to six weeks.

We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 2.38c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅜ x 6 inches, rolled thread, 75-10; larger sizes, 70-2½.

Machine bolts, up to ⅜ x 4 inches, rolled thread, 75-10-5; cut thread, 75-10; larger sizes, 70-7½.

Hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt.

Sheets.—The market for sheets appears to be unsteady in some respects, as conflicting reports have been received from both mills and jobbing interests. One of the latter reports a very heavy run of business in this material in gage No. 10 and under. Sheet mills in this territory are not operating at capacity, however, and it is probable that good tonnages would induce quotations under the market from some of the smaller makers.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.25c; No. 12, 2.20c. Box annealed, No. 28, 2.90c. Galvanized No. 28, 4.15c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—Jobbers in wire products throughout the country seem to be of the opinion that crop conditions are favorable so far as can be determined at present, and in consequence are covering for good tonnages. In spite of the continued activity, however, the leading interest has been able to keep up prompt deliveries.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03, with 40c for galvanizing; plain wire, jobbers, carload lots, $1.73; retailers' carload lots, $1.78.

Merchant Pipe and Tubes.—Continued pressure for delivery is being experienced by the jobbers in this territory, but new business is still comparatively light. Prospects for spring activity, however, are exceedingly good and makers in this territory are very optimistic.

We quote, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	42.2
⅜ inch	73.2	62.2	66.2	....
¼ inch to 1½ inch	76.2	67.2	69.2	57.2
Lap.				
2 inch	73.2	64.2	65.2	54.2
4½ inch to 6 inch..	75.2	66.2	67.2	57.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	65.2	54.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	58.2	46.2
½ inch	69.2	57.2	63.2	51.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	64.2	52.2
7 inch to 8 inch....	64.2	52.2	58.2	46.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1¼ inch.	60.2	48.2	....	....
Lap.				
2 inch	58.2	48.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes

Diameter.	List price.	Lap weld steel, per cent off.	Charcoal iron, per cent off.	Cold seamless, per cent off.
1	30	..	..	57½
1¼	28	..	..	52½
1½	27	..	..	47½
1¾	22	51	40	35
2	20	51	40	35
2¼	22	51	36	35
2½	28	56	43¼	40
2¾	31	56	43¼	40
3	34	61	47	46
3¼	40	61	47	46
3½	43	63	40	46
4	55	63	50	46
5	76	56	..	..
6	102	56	..	..

Cast Iron Pipe.—The city of Grand Rapids, Mich., will close bids on 1,000 tons of water pipe on Feb. 26, and Minneapolis, Minn., is in the market for 1,200 tons, on which bids will close on March 3. There is considerably more activity in Canada than is apparent on this side of the line, the city of Edmonton having closed for 4,000 tons and both Hamilton and Ottawa taking tonnages. We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $31, 6 to 12 inches, $29, larger sizes, $28, gas pipe, $1 a ton higher.

Old Material.—The market for old material is quiet and in consequence quotations are sagging. We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$16.75 to 17.25
Old iron rails	16.25 to 16.75
Rerolling rails (5 ft. and over)	15.50 to 16.00
Old steel rails (3 ft. and und.)	14.25 to 14.75
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.50 to 13.00
Shoveling steel	12.25 to 12.75

Net Tons

No. 1 R. R. wrought	$12.00 to 12.50
No. 2 R. R. wrought	11.25 to 11.75
Arch bars and transoms	16.25 to 16.75
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	18.25 to 18.75
Locomotive tires	13.50 to 14.00
Dealers' forge	10.75 to 11.25
Pipe and flues	8.75 to 9.25
No. 1 cast	13.50 to 14.00
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.75 to 8.25
No. 1 boiler cut	9.25 to 9.75
Boiler punchings	13.00 to 13.50
Cast and mixed boring	6.75 to 7.25
Machine shop turnings	7.75 to 8.25
Railroad malleable	13.25 to 13.75
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	11.50 to 12.00
Stove plate and light cast scrap	11.00 to 11.50

CLEVELAND

Low Pig Iron Prices---Mills Busy

Office of THE IRON TRADE REVIEW,
Penton Bldg., Feb. 25.

Iron Ore.—The Pittsburgh Steamship Co. has ordered engineers of the water tube boiler boats to report on board their ships on March 3 to begin fitting out, and the engineers of the first class boats and those of the second class boats having Scotch boilers will report March 10 and March 15, respectively. It is expected that the ships will be ready to sail during the first week in April. Of course, much will depend upon ice conditions, but if the ice leaves the lake by April 1, a number of ships will be sent out. These orders of the Pittsburgh Steamship Co. furnish the first indications of the near approach of the navigation season of 1913, which is expected to be the busiest in the history of the lakes.

Shipments of ore from Lake Erie docks to blast furnaces are very heavy and the expectation is that the docks will be fairly well cleaned up by the opening of navigation. Of course, there will be a sufficient burden left on dock to take care of furnace requirements even after navigation has opened, as the full amount of ore on dock at the close of navigation has never yet been transferred to furnaces during the winter season.

Ore shippers are still in the market for tonnage to move their requirements and practically all of the companies operating tonnage have reserved their entire capacity for their own needs. Smaller shippers will have difficulty in covering and will have to depend upon wild vessels and pay a somewhat higher rate than the contract rate.

One firm reports some inquiries for ore, but inquiry is by no means general. It is expected, however, that before the opening of navigation there will be decided increase in interest on the part of ore buyers.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—The pig iron market is in a peculiar condition at the present time. The melt continues very heavy and it is confidently expected that if consumption is maintained at the present rate, foundries will, at a not far distant date, be compelled to go into the market, and it will not be surprising to see a buying movement of good size. Just now, however, the market is weak. In the city of Cleveland, there is absolutely no business being done and quotations are nominal. Cleveland iron is, however, going to distant points, and some not far distant, and on such sales, sellers are absorbing the freight, so that the furnace price for delivery outside of Cleveland has fallen as low as $16.25 for No. 2 foundry for early delivery. For delivery in Cleveland, the usual quotation is $17.50, delivered. It does not seem probable that unless conditions change decidedly for the better the Cleveland Furnace Co. will blow in its second stack. The Cumberland Rolling Mill is inquiring for 750 tons of basic per month for the last half of the year. For the first half of this year, we quote as follows, delivered Cleveland:

No. 1 foundry	$18.00
No. 2 foundry	17.50
No. 2 southern	17.35 to 17.85
Bessemer	18.15
Lake Superior charcoal	19.10
Silveries 8 per cent silicon	21.55
Bessemer ferro, 14 per cent	29.55

Coke.—Foundries are buying very limited quantities of coke. The market is still weak, although not as weak as it was a few days ago. Stock coke is scarce and sales have been made as high as $2.50, ovens.

Connellsville furnace coke, $2.35 to $2.50 for prompt delivery, and $2.50 to $2.75 on contract; Connellsville foundry coke, $3.50 to $3.75 for prompt, and $3.75 to $4 on contract.

Finished Material. — Some important projects are being figured upon, including the large tonnage of structural material for the Otis Steel Co. buildings, and the new plant to be erected at Rio de Janeiro, Brazil, by the Goodyear Rubber Co., Akron, but neither project has yet taken definite form. Corrigan, McKinney & Co. are excavating for their open-hearth furnaces and it is expected that erection of the steel work will be started June 1. Mills report the continuance of heavy specifying and they look forward to increased buying as spring approaches. The agricultural implement concerns are expected to become more active in efforts to make contracts and it is believed that large orders will also be placed by railroads. Nut and bolt manufacturers report that they have orders booked to such an extent that they cannot now promise deliveries in less than three months and business is unusually brisk for this season of the year. Price cutting in nuts and bolts reported in some other districts by jobbers has not developed in the Cleveland territory. Bar iron prices are firmer and somewhat higher prices prevail on most business, but the Erie railroad is understood to have placed an order somewhat lower than prevailing quotations. For prompt delivery of steel bars, as high as 2.10c has been paid. The sheet market is firm and full prices are obtained without difficulty.

Old Material. — Mills are accepting fair sized tonnages of scrap which Cleveland dealers are shipping on contracts. Good demand is being made by foundries for No. 1 machinery cast, and there is an active market for cast borings. Heavy melting steel, No. 1 busheling and No. 1 railroad wrought are quiet. Prices, unchanged from last week, follow:

Gross Tons

Old iron rails	$15.50 to 16.50
Old steel rails (under 3 ft.)	14.50 to 15.00
Old steel rails (over 6 ft.)	15.50 to 16.50
Relaying rails	27.00 to 28.00
Old steel boiler plate	11.00 to 11.25
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	10.00 to 10.50
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	12.50 to 13.00
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.00 to 11.50

Net Tons

No. 1 R. R. wrought	$13.00 to 13.25
No. 1 busheling	11.50 to 12.00
No. 1 machine cast	12.50 to 13.00
No. 1 dealers' wrought	10.50 to 11.50
Machine shop turnings	6.50 to 7.00
Pipes and flues	9.00 to 9.50
Wrought drillings	6.50 to 7.00
Cast borings	7.00 to 7.50
Stove plate	9.00 to 9.50
Wrought iron arch bars	17.00 to 17.50
Wrought iron piling plate	16.00 to 16.50

Makes Final Report

James Bowron, trustee of the Southern Iron & Steel Co., Birmingham, Ala., made his final report to E. H. Dryer, referee in bankruptcy, last week. The report is a very satisfactory one, showing that the net earnings for January were $36,032.21, which with a balance of profit previously brought forward leaves a total credit of $60,357.43.

CINCINNATI

Resale Iron Going at Low Prices

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Feb. 25.

Pig Iron.—The pig iron market is stationary, which condition is due mostly to the fact that transactions have generally been few and for small tonnages for some time. There is no tendency of an advance in prices at the present time, and the fact that buyers in several instances are asking concessions for contract shipments, indicate that some, at least, are rather pessimistic as to the immediate future of the market. Furnace interests, as a general rule, are holding fairly firm as to quotations, and state that a better buying movement will develop soon, which will be the means of strengthening conditions to a great extent.

There appears to be more resale iron now in southern Ohio than in the south, which is the reverse of last week. It is being offered at $16.25, Ironton, for nearby delivery, and it is also rumored that a furnace in that district has made the same price for the first half in several cases. Furnaces are generally holding for $16.50, Ironton, for the first half, but business could also probably be had for the second half at these figures.

Resale iron in the south is prevalent at $13, Birmingham, and includes both Tennessee and Alabama grades. Furnace iron in Tennessee can be had at from $13.25 to $13.50, Birmingham basis, for the first half, and probably deliveries would be made to extend into the second half on these quotations. In Alabama, $13.50, Birmingham, is now the prevailing figure for furnace iron, and few sales, if any, are being made above it.

A southern Indiana concern has recently bought a quantity of malleable iron for the last half, reported to range from 1,000 to 3,000 tons, which is the only transaction of any size made here during the past week. A local melter is in the market for 600 tons of northern and 600 tons of southern No. 2 foundry iron for the second half. The Mannie furnace, at Allen's Creek, Tenn., has blown in after being out for relining since the first of the year. With freight rates $3.25 from Birmingham, and $1.20 from Ironton, we quote Cincinnati prices for the first and second quarters as follows:

Southern foundry No. 1	$17.00 to 17.50
Southern foundry No. 2	16.25 to 17.25
Southern foundry No. 3	16.00 to 16.50
Southern foundry No. 4	15.75 to 16.25
Southern gray forge	15.50 to 16.00
Mottled	15.50 to 15.75
Southern No. 1 soft	17.00 to 17.50
Southern No. 2 soft	16.25 to 17.25
Standard southern car wheel	27.25 to 27.75
Northern No. 2	17.45 to 17.95
Northern No. 3	17.20 to 17.70
Northern No. 4	16.95 to 17.45
Silveries 8 per cent silicon	20.70 to 21.20

Coke.—The coke market has settled at a more definite level than for some time. This is accredited to the fact that the surplus of spot coke that was thrown upon the market when several furnaces unexpectedly blew out for relining recently, has been about cleared up. Production and consumption are now more nearly equal than for several months, but it is probable that the ovens are still producing a little more now than is being consumed. Domestic coke business, which had reached a very low ebb, has increased within the past few days owing to the recent cold spell. There appears to be a slight weakness in Wise county furnace coke, as several lots have been sold at $2.35 per ton, ovens, for spot shipment within the past week, when the market is generally given as $2.50, ovens, as the minimum for this delivery. New River and Pocahontas furnace and foundry cokes are the same in regard to price for both spot and contract delivery. We quote from the leading coke producing fields as follows:

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$3.25 to 4.00	$3.50 to 4.00
Furnace coke	2.50 to 3.00	2.50 to 3.00
Wise county district:		
Foundry coke	$3.25 to 4.00	$3.25 to 3.50
Furnace coke	2.40 to 3.00	2.50 to 3.00
Pocahontas district:		
Foundry coke	$3.25 to 3.75	$3.25 to 3.75
Furnace coke	2.50 to 2.75	2.75 to 3.00
New River:		
Foundry coke	$3.25 to 4.00	$3.25 to 4.00
Furnace coke	2.90 to 3.10	2.90 to 3.10

Finished Material.—The local sheet mill is from 12 to 13 weeks behind on deliveries, and new orders being placed at the present time are about equal to its entire output. Specifications continue heavy, and premiums are being offered in some cases for deliveries as far as six weeks ahead. Prices are 2.35c on black sheets No. 28 gage, and 3.50c on galvanized sheets, No. 28 gage.

Warehouse business continues fairly good, and most of the warehouses have badly depleted stocks at the present time. They are also finding it a hard proposition to replenish them, and are offering good premiums for nearby shipments. We quote warehouse prices, f. o. b. Cincinnati, as follows:

Steel bars, 2.05c to 2.15c, base; iron bars, 2.00c to 2.10c, base; structurals, 2.10c to 2.25c, base; plates, ¼ inch and over, 2.10c to 2.25c, base; sheets, blue annealed No. 10, 2.25c to 2.90c, base; rivets, cone head 2.60c to 2.70c, base; cold rolled shafting, 58 to 55 per cent off on round, and 55 to 50 per cent discount on flat, square and hexagon; steel hoops, 2.10c to 2.20c, base; full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c to 2.25c; ⅝ inch square and larger, 2.25c to 2.35c; ½ inch square and larger, 2.35c to 2.45c; 5-16 inch to ⅜ inch square and larger, 2.25c to 2.65c; and ¼ inch square and larger, 2.65c to 2.75c.

Old Material.—The scrap iron market is very uncertain and prices are fluctuating a great deal, depending more at times upon the conditions of the sale than anything else. There is a general tone of weakness that is noticeable. A part of the iron work of the old bridge at High Bridge, Ky., which was recently demolished to make room for a modern structure, has been bought by local scrap iron dealers, the tonnage amounting to about 1,000 tons. Transactions generally, though, are of a smaller nature. There is probably more No. 1 machine cast and No. 1 busheling being sold at present by the dealers than anything else and their prices have held accordingly. We quote below prices dealers will pay and also dealers' selling prices f. o. b. yards in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$13.00 to 13.50
Old steel re-rolling	11.50 to 12.00
Old iron axles	17.50 to 18.00
Heavy melting scrap	11.00 to 11.50
Relaying rails	20.25 to 20.75
Bundled sheet scrap	8.50 to 9.00

Net Tons

Old No. 1 R. R. wrought	$10.25 to 10.75
No. 1 yard wrought	8.75 to 9.25
No. 1 machine cast	10.50 to 11.00
No. 1 busheling	8.75 to 9.25
Stove plate	7.50 to 8.00
Machine shop turnings	6.50 to 7.00
Cast borings	6.75 to 7.25
Heavy turnings	7.00 to 7.50
Mixed cast	9.00 to 9.50
Breakage	6.75 to 7.25
Malleable	8.50 to 9.00

PHILADELPHIA

Heavy Production Continues---Iron is Stirring

Office of THE IRON TRADE REVIEW,
Philadelphia, Feb. 25.

The heavy production rate in ingots and finished products which with a number of eastern works was the highest in their history in January, is being steadily maintained this month. The total tonnage, however, will not be so large, owing to the shorter month. A very liberal volume of new business and a heavy flow of specifications falls a little short of matching the outgo of product and there continues a mild improvement in deliveries of finished materials. Prices in finished lines are very staple. Sentiment in the eastern pig iron market is moderately more cheerful in the expectation that renewed activity is approaching closely. There is some increase in the volume of inquiry. Prices continue soft and irregular. Buyers of old material seem more impressed with the unusual opportunities in the present low prices, but there have been further declines in the past week. Heavy melting steel is down to $13.00, delivered.

Pig Iron.—Sentiment on the selling side of the pig iron market in eastern Pennsylvania has taken on a little cheerier aspect during the past week. This is due, in a considerable degree, to the belief that the time is approaching closely when buyers will be driven by their heavy consuming needs more broadly to enter the market; some of the better feeling is based upon the new inquiry of the week, which, while still modest, has been larger in total and more widely distributed.

Basic iron, which has been of nominal strength in the east for some weeks at around $18, delivered, bids fair to be determined in price by negotiations now in progress. One eastern steel maker is inquiring for 6,000 tons of this grade for third quarter, and a Cumberland, Md., tin plate maker is asking for 4,500 tons, equally divided over the last half. A leading Delaware river pipe maker is tentatively figuring upon the purchase of about 15,000 tons of low grade iron for delivery by July and is now making definite offers on several thousand tons. This buyer recently took about 3,000 tons of low grade iron from a Lehigh Valley maker. Softness of prices continues to be manifested in such sales as are being made in the present dull market. This is especially true in forge and low grade iron. A recent purchase of 2,500 tons of northern mill forge by a Schuylkill Valley consumer, was done below $16.50, delivered. Other makers have been quoting around $17, delivered. Pipe iron is selling over a range of $16 to $16.75, delivered, according to quality. There is so little movement to foundry grades that the price limits are still a matter of conjecture. Northern No. 2X, according to brand and destination, ranges from about $18 to $18.50, delivered. A small sale of No. 2X at $18.15, delivered, this district, and of No. 2 plain to a more distant point at $17.75, delivered, are noted. Virginia iron continues to move in small lots on the basis of $15.50, furnace, for No. 2X. Carload sales of standard low phosphorus at $24.50, Philadelphia, are reported. An inquiry for 1,000 tons for western shipment is pending. A local buyer, who has recently been inquiring for 1,000 tons of prompt malleable has closed against the order.

We quote for prompt and first quarter shipment delivered to consumers' plants, in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.00 to 18.50
Eastern Pa. No. 2 plain	17.75 to 18.00
Standard forge (Eastern Pa.)	16.75 to 17.00
Basic (Eastern and Central Pa.)	18.00
Virginia No. 2X	18.30 to 18.55
Southern No. 2	17.50 to 18.00
Malleable	19.25 to 19.50
Standard low phos. Phila.	24.50

Iron and Steel Bars.—Sales of soft steel bars for prompt delivery are reported on the basis of 2.25c, eastern Pennsylvania mill. More special analysis bars for early shipment are selling regularly at considerably higher levels. Practically no improvement is shown in steel bar deliveries which with the larger mills, reach three to six months. Contracting is not very active, owing to the heavily sold-up condition of makers, but consumers still find themselves obliged to pay fancy premiums for sorely-needed prompt steel. Forward prices are unchanged. Bar iron continues steady at 1.60c, eastern Pennsylvania mill, for either prompt or forward delivery. Premiums for early iron bars are much more difficult to obtain.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.65c to 1.75c. Prompt steel bars on mill shipments are quoted at 1.85c to 1.95c, delivered, and from store are quoted at 2c to 2.15c, delivered. Cut nails are quoted from 1.90c to 1.95c, Philadelphia. Shafting is quoted at 58 and 53 off in base territory.

Plates. — Considerable bridge steel is now pending before eastern plate makers, current inquiries including one lot of 7,000 to 8,000 tons and another of 2,000 tons. Car and locomotive tonnage going to the mills is quite liberal and from all directions, specifications are so heavy as to keep the mills running at the highest gait. While new business is very good, the back accumulation of tonnage is being slightly reduced and deliveries continue easier, ranging from four to six weeks, on lots of size. Shipments in universal plates, especially, show improvement. Eastern ship yard men have tenders out for six boats, which call for a heavy tonnage of steel. The information is not forthcoming whether these include any vessels for the Hamburg-American Steamship Co. and B. W. Baker, the latter having announced plans at Washington recently for the building of a line of Atlantic-Pacific boats to run through the Panama canal.

We quote delivered to consumers' plants in Philadelphia and vicinity: Sheared steel plates on contract, 1.60c to 1.75c; universal plates on contract, 1.60c to 1.80c; sheared plates for early delivery, 1.75c to 1.85c; universal plates for early delivery, 1.80c to 1.85c. Plates from store are quoted at 2.15c to 2.25c, delivered.

Structural Shapes.—Though deliveries offered by eastern mills in structural shapes are measurably more prompt, many buyers still have trouble to get material in such lots and as quickly as they need it. There is some premium business still going, but the volume is less. Early shapes bring 1.75c, eastern Pennsylvania mill. On forward tonnage, the market among eastern makers ranges from 1.50c to 1.60c, Pittsburgh, or 1.65c to 1.75c Philadelphia. The Virginia Bridge & Iron Works is the low bidder on the approximately 7,500 tons of bridge work for the Norfolk & Western railroad and will probably receive the bulk of the award. The Pennsylvania Steel Co. will furnish several thousand tons for a lift bridge for western delivery. There is some talk of the possible erection of a 37-story office building at Broad and Locust streets, this city, and preliminary plans are under way, but it has not been demonstrated whether the project is a feasible one. The

United States Steel Products Co. and the Riter-Conley Mfg. Co. submitted bids for the Balboa-Cristobal transmission line, Panama canal, but it is expected that the bids may be readvertised because of errors in computing the tonnage called for. No decision has been reached on the South Penn Square office building, this city, 2,200 tons.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Structural shapes on contract, 1.60c to 1.75c; for early delivery, 1.80c to 2.00c; from warehouse stocks, 2.15c to 2.25c.

Semi-Finished Steel.—Middle western consumers, several of them steel makers themselves, continue to ask eastern producers for billets and other forms of semi-finished steel to meet current shortages. Several of such inquiries were put before eastern Pennsylvania makers the past week, and manufacturers of seamless tubes were prominent among those seeking material. Eastern makers, however, have little steel open for first half. In one or two cases, the buyers were desirous of making contracts for third quarter and some eastern interests are also in the market for that period. Eastern inquiries include 2,000 tons of tin bars for third quarter for a Cumberland mill and 400 tons of billets for an eastern Pennsylvania bar manufacturer.

We quote delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer rolling billets at $30 to $31, and forging billets at from $36 to $40.

Sheets.—Eastern Pennsylvania makers of sheets are now closing contracts pretty freely for second quarter at their schedule of 1.90c, Pittsburgh, or 2.05c, Philadelphia, for No. 10 blue annealed, and, in a few cases, for third quarter at the same level. Consumers realizing the difficulties of getting material are now entering their specifications much farther ahead than they have been accustomed to do. According to reports, some sheet makers in the Pittsburgh district have oversold their capacities and they are tentatively looking to the east to help them out on any possible shortages.

We quote for delivery to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at from 1.95c to 2.05c.

Old Material. — Intrinsically, scrap materials have reached a very attractive price stage and consumers are beginning to show a little more interest in their opportunities. Inquiries during the past week have been a little more numerous in a scattered way and here and there buyers are picking up bargain lots with more assurance. The decline in prices, however, has not been arrested. A Schuylkill Valley steel maker bought about 5,000 tons of heavy melting steel around $13.25, delivered, or less. Other small sales at this price are noted and it is apparent that $13 could be done on lots under pressure. This is the price some mills are now offering. Many other grades are off 25 to 50 cents this week. Sales of rerolling rails at $15.50, delivered, are noted.

We quote gross tons, delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails (nominal)	$17.00 to 17.50
Old steel rails (rerolling)	15.50 to 16.00
No. 1 heavy melting steel	13.00 to 13.50
Old car wheels	15.00 to 15.50
Old iron axles (nominal)	26.00 to 27.00
Old steel axles	19.50 to 20.00
No. 1 railroad wrought	15.00 to 15.50
Wrought pipe	12.50 to 13.00
Cast borings	10.00 to 10.50
Machine shop turnings	10.25 to 10.75
Heavy cast (broken)	14.00 to 14.50
Malleable	13.00 to 13.50
Stove plate	10.50 to 11.00
No. 1 forge	12.00 to 12.50
Low phosphorus	17.50 to 18.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

BIRMINGHAM

Pig Iron Sales Confined to Small Lots

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Feb. 25.

Pig Iron.—New business added to local order books in the past week consists of carloads and lots of 100 to 150 tons each, and is small in the aggregate. The average selling price for the week is practically the same as for the week previous, although the demand was met to a greater extent by re-sale and off-grade iron. For the re-sale tonnage, a basis of $13 per ton at Birmingham for No. 2 foundry has been accepted in certain cases where spot delivery could be made; but for the bulk of such tonnage being offered, a basis of $13.50 to $14 per ton at Birmingham is being asked. The furnace companies have not revised quotations, and without exception, where quotations are being made, adhere to a basis of $14 per ton at Birmingham for any delivery in the remainder of the first half. For delivery after the first half, no quotation has been established, but the $14 price would no doubt apply to an attractive tonnage. An opinion in this regard can only be based upon the attitude manifested by the furnace interests, as no record has been made of deliveries so far advanced, and the tonnage recently offered was not in bona fide form. Inquiry is being received in larger volume than for some weeks past, and a wider range of territory is represented. The spot demand has not improved to the extent expected, but in this, the present rate of delivery against old contracts is considered effective. Forwardings from all plants have been fairly satisfactory so far in the month, with the production during that time very close to a maximum figure. The aggregate stock accumulation has increased, but the increase remains in the hands of the furnace companies, while the total merchant or speculative iron, has been reduced. For the present, the basis of the market is considered firm, but in the absence of trading actual selling figures cannot be furnished other than for such small lots as are changing hands for prompt consumption. We quote for the remainder of the first half, as follows, per gross ton, f. o. b. cars Birmingham district furnaces, viz.:

No. 1 foundry	$13.50 to 14.50
No. 2 foundry	13.00 to 14.00
No. 3 foundry	13.00 to 13.50
No. 4 foundry	12.50 to 13.00
Gray forge	12.00 to 12.50
Mottled	11.50 to 12.00
Standard basic	14.00 to 14.50
Off basic	11.00 to 11.50
Charcoal	25.00 to 25.60

Cast Iron Pipe.—This market is very quiet with the trading limited to small requirements for maintenance and extensions. Quotations have not been changed, but in view of all conditions, it is quite probable that material shading would be done for attractive municipal requirements. Water pipe is quoted at $24.50 per net ton at Birmingham for 4-inch size, and $22.50 per ton, an average for the larger sizes. Gas pipe is quoted at an advance of $1 per net ton over the price asked for water pipe, with special fittings quoted at $45 to $50 per net ton.

Old Material.—The sale of 1,000 tons of steel scrap at $11.50 per gross ton at Birmingham, and a similar quantity of light cast at $11 per ton, Birmingham, was the feature of the market in the past week. Aside from this just mentioned, carloads were involved, with the aggregate very small comparatively. Quotations have been revised since last report, and we quote present asking prices about as follows, per gross ton, f. o. b. cars here, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	15.50 to 16.00
Old iron rails	14.00 to 14.50
No. 1 R. R. wrought	12.50 to 13.50
No. 2 R. R. wrought	10.50 to 11.50
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	10.50 to 11.00
No. 1 steel scrap	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	12.50 to 13.00
Light cast and stove plates	9.00 to 9.50

NEW YORK

Pig Iron Prices Soft, But Sentiment Strong

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Feb. 25.

Iron Ore. — While there is still some shortage of vessel tonnage in the Cuban ore trade, the February shipments have almost reached normal proportions and the leading operator will bring in from 90,000 to 100,000 tons. Because of the better movement, stock piles of ore at docking points are being drawn upon less heavily. The eastern ore market is devoid of buying activity. Shipments continue very heavy.

Pig Iron.—Another week of a practically lifeless market in this district has left unmoved the deadlocked position of buyers and sellers of pig iron. A better feeling among sellers has been struggling to assert itself, doubtless in the assumption that an early revival of buying may be expected from the continuance of the heavy consumption; but when this tendency is analyzed, it is found to be wholly sentimental and in no sense based on any broader buying interest. The new inquiry to appear within the past week has been almost negligible, being limited to a few lots of several hundred tons each. Buyers who have been in the market for some days show no hurry to close. An Irvington, N. Y., manufacturer of heating equipment, who has been inquiring for 1,000 tons of foundry grades for second quarter, still has this business open. It is understood this buyer has been quoted prices on northern No. 2X below $18, delivered, which is equivalent to less than $17, eastern Pennsylvania furnaces. The $17, furnace, price has heretofore been considered the minimum of the market. The inquiry in the market at this stage, however, is so meager, that it is scarcely possible to judge the strength of the market from the few instances presented. Broadly, eastern Pennsylvania No. 2X ranges from $17 to $17.50, furnace, or $18 to $18.25, tidewater, with the usual differentials for other grades. Virginia iron continues unchanged on the basis of $15.50, furnace, for No. 2X, which is applicable for prompt, second and third quarters and probably for the remainder of the year. A Massachusetts machinery builder this week recived an inquiry for 6,000 tons of high phosphorus and regular foundry iron for second quarter delivery. The Musconetcong furnace, Stanhope, N. J., resumed in the week on foundry iron after an idleness of several years.

We quote for prompt and first half shipment at tidewater, as follows:

Northern foundry, No. 1	$18.25 to 18.50
Northern No. 2X foundry	18.00 to 18.25
Northern No. 2 plain	17.75 to 18.00
No. 2 Virginia	18.30 to 18.55
No. 2 southern foundry	18.50 to 18.75
Malleable	18.75 to 19.00
Gray forge	16.75 to 17.00

Ferro-Alloys.—Offerings of prompt ferro-manganese at concessions from the established price of $65.00, seaboard, are less in evidence, and the market to this extent seems firmer. Carload sales are noted at the full price. Apart from one tentative inquiry of fair size, there is little interest in the market among consumers. Inquiries for some small lots of spiegeleisen for eastern shipment have come out. Domestic spiegeleisen is quoted around $30, seaboard, with foreign material several dollars higher.

We quote standard English 80 per cent ferro-manganese at $64 to $65, seaboard, for early and for first half shipment and $65 for second half; 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia, for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates.—The Pennsylvania railroad officially announces that it has distributed for 2,305 additional freight cars for the lines east, of which 1,000 refrigerator and 500 steel and wood gondolas, will be built by the American Car & Foundry Co. at Berwick, Pa., and 805 steel and wood gondolas for the Standard Steel Car Co. at Butler, Pa. This order will require 46,100 tons of steel. The total recent car purchases of the Pennsylvania system, as officially stated, now reach 12,305. The Boston & Maine railroad has increased to 6,000 the number of cars it is figuring upon. While formal inquiries have not yet been issued, awards are expected at an early date. The Baltimore & Ohio railroad has taken bids against its inquiry of 1,000 hoppers and 500 refrigerators. The Seaboard Air Line is still figuring on 1,500 cars and the Norfolk & Southern issued specifications this week for 300 box, 200 flats and six cabooses. The directors of the Chesapeake & Ohio railroad have again deferred action upon the contemplated purchase of 3,000 hoppers. The plate market from an eastern mill standpoint is still active and operations are continued on a high rate. Deliveries range from four to six weeks. Prices with eastern Pennsylvania mills are very firm at 1.60c to 1.65c, Pittsburgh.

We quote, delivered at New York tidewater, for first quarter, 1.76c to 1.81c, New York, on sheared plates. Some makers are asking $1 higher for universal plates. On third quarter and last half contracts, Pittsburgh district, makers are quoting 1.61c to 1.66c, New York. Plates from store 2.15c.

Structural Shapes.—Fabricating interests report some increase in inquiry during the past week, which is of a miscellaneous character. The tonnage for export in the open market, particularly for South America, is considerably heavier. The new tonnage that is coming out, while not large in the aggregate, illustrates the numerous building projects that are accumulating in this district. Conditions with the mills in the eastern district continue very favorable, though deliveries have eased up somewhat. Eastern shape makers are receiving some liberal tonnages from eastern car plants. Shape prices with eastern Pennsylvania makers continue from 1.50c to 1.60c, Pittsburgh, or from 1.66c to 1.76c, New York.

Considerable steel tonnage is expected to be called for shortly for the construction of large coaling stations at the Atlantic and Pacific ends of the Panama canal, and also for an oil handling plant on the Isthmus. Bids will be asked in the near future on this work. Lettings in this district this week include 900 tons to the Hinkle Iron Works for the McMorrow Engineering & Construction Co. loft, West Thirty-fifth street; 500 tons to the Noelke-Richards Iron Works for the Samaritan Hospital, Troy, N. Y.; 350 tons for Levering & Gerrigues, for an addition to the plant of the Meade, Morrison Mfg. Co., East Boston, Mass.; 500 tons to an independent shop for the A. H. Martin office building, Norfolk, Va.; 250 tons to the Cambria Steel Co. for the Orino Pulp & Paper Co., Stillwater, Me. The American Bridge Co. has been formally awarded about 4,000 tons for the bakery for the Loose-Wile Biscuit Co., Brooklyn, and will furnish 650 tons of the Norfolk & Western bridge inquiry for 7,500 tons, the bulk of which is expected to go to the Virginia Bridge

& Iron Works. The General Vehicle Co. building, Long Island City, which was figured to require about 2,000 tons of steel, has gone concrete. Bids went in this week on about 8,000 tons for the Lord & Taylor uptown store, this city. Bids have been asked for 500 to 600 tons for a bridge for the Central of New Jersey, at Catasauqua, Pa., and for a new pier shed at Weehawken, N. J. The New York Central has partially awarded to independent shops its recent inquiry for additional terminal areas, this city, amounting to about 1,500 tons.

Fabricating interests continue to show aggressiveness for work and the past few weeks have brought out some of the lowest prices of this character that have been made in this district for some time.

We quote for New York delivery for first quarter as follows: Structural shapes, 1.66c to 1.76c. On third quarter and last half contracts, Pittsburgh district makers are quoting 1.61c to 1.66c New York.
Structural shapes from store, 2.15c.

Iron and Steel Bars. — Some buyers of steel bars in this district, instead of closing contracts for third quarter or beyond, are giving the mills blanket orders or specifications for their full quarter requirements and are having deliveries scheduled for the first month. This is being done by the consumers in view of the congested state of bar deliveries, in order to insure themselves of shipments when they need the steel. Other buyers continue to file specifications against contracts as far ahead as September and October delivery to confirm their position on mill schedules. Steel bars continue at 1.40c, Pittsburgh, or 1.56c, New York, with prompt bars bringing premiums of $6 to $10 a ton. Eastern bar iron makers continue to book a fair business at the minimum base of 1.60c, mill.

We quote for New York delivery, steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.65c to 1.75c. Steel bars from store are quoted at 2.05c.

Cast Iron Pipe.—Some lower prices at the foundry have been brought out by eastern makers by recent lettings. These quotations have approximated $21, or slightly less for 6 to 8-inch pipe, whereas makers have been receiving from $22.50 to $23.50, at the plant. Considerable business is going, but lower pig iron prices seem to be influencing some makers to be more aggressive for orders. Recent lettings include 2,200 tons of 48-inch pipe for Atlantic City to the United States Cast Iron Pipe & Foundry Co. at $22.25, delivered; 1,600 tons of 6 to 24-inch for Hartford, Conn., to the Standard Cast Iron Pipe & Foundry Co. at $23.95, delivered; 400 tons for Belmar, N. J., to the United States Cast Iron Pipe & Foundry Co. New offerings include 400 tons of 24 to 36-inch pipe for Boston to close March 4, and also a re-letting of 680 tons of specials for Boston to close March 6, and 340 tons for Fall River, Mass., of 6 to 16-inch, to close March 4. Asbury, N. J., will soon be in the market for about 3,000 tons.

We quote six-inch pipe at from $23 to $25, f. o. b. New York, in carload lots.

Old Material. — Sellers are having difficulty to interest consumers in scrap, notwithstanding the unusually attractive prices now prevailing. There is plenty of material on the market and values are still sagging. Dealers are now offering but $11, New York, for heavy steel, and the eastern Pennsylvania market is $13 to $13.25, delivered. Some steel makers express themselves as willing to pay more for small lots than for round tonnages. This is the reverse of what is usually their attitude, and indicates their anticipation of further decline. Steel axles and steel shaftings are bringing the relatively favorable prices of $18.75 and $18.00, delivered eastern Pennsylvania, respectively. Other grades are rather hard to be moved. We quote gross tons, prices New York dealers will pay at tidewater for shipment usually to the eastern Pennsylvania consuming market, as follows:

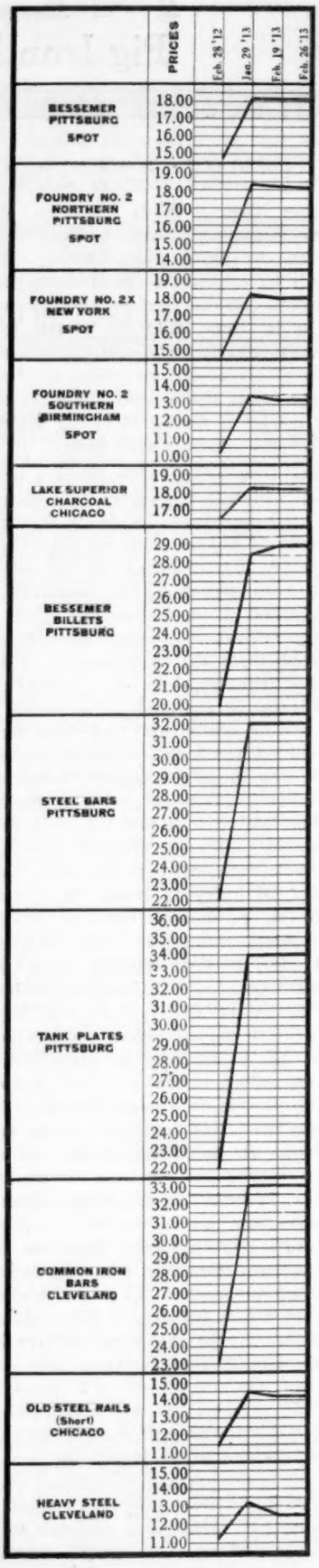
Old car wheels	$13.00 to 13.25
Old iron axles	23.00 to 23.50
Steel axles	16.00 to 16.50
Old steel shafting	15.00 to 15.50
No. 1 heavy melting steel	10.75 to 11.00
No. 1 R. R. wrought	13.00 to 13.50
Wrought pipe (not galvanized)	10.50 to 11.00
Cast borings	7.75 to 8.25
Machine shop turnings	8.25 to 8.75
Heavy cast	11.50 to 11.75
Stove plate	8.25 to 8.75
Grate bars	7.75 to 8.00

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

Chicago Foundrymen's Club

Chicago, Feb. 25.—The next regular meeting of the Chicago Foundrymen's Club will be held Saturday, March 8, at 8 p. m., in room 38L, Great Northern hotel. A special program has been arranged and John Whitman, superintendent of the Chicago house of correction, will give an address on the work which his institution is doing in correcting the habits of men who have developed criminal tendencies. It is expected that this address will be of special interest to employers of unskilled labor, and a large attendance is anticipated. A buffet luncheon will be served after the meeting.

PRICE CHART



BUFFALO

Hot Metal Sold to Lackawanna Steel Co.

Office of THE IRON TRADE REVIEW,
Buffalo, Feb. 25.

Pig Iron.—The placement for the week amounted to about 10,000 tons, in a market that continues quiet with only a light demand in evidence. The buyers seem disinterested, maintaining the attitude they have shown for the past nine weeks. In the face of this position, shipments from the furnaces continue heavy on contracts placed last fall, to meet the current needs of the melters. It is reported in many instances that consumers are exhausting the iron they have under contract, and, with little or no supply on hand other than the tonnages coming out under specification, are making no effort to cover for a continued demand for their products. The sales for the week were scattered and largely for particular grades, including a few orders for basic in carload lots or so. The absence of a demand has caused a softening in the schedule on high silicon irons, but has not affected the other grades. Inactivity makes the range quoted below an approximate one, as inquiries for very large tonnages at this time might be met with a further shading of prices.

It was given out today that the placement of 45,000 reported two weeks ago, included about 40,000 tons of basic hot metal sold by the Rogers-Brown Iron Co., Buffalo, to the Lackawanna Steel Co., for delivery over the fourth quarter. This will be delivered from the Susquehanna furnaces of the Rogers-Brown Iron Co., in ladle cars, to the Lackawanna plant, which is adjacent to it, and will require practically the entire output of one of its stacks.

The range for the week is substantially as follows, f. o. b. Buffalo:

No. 1 foundry	$17.00 to 17.50
No. 2X foundry	17.00 to 17.25
No. 2 plain	16.75 to 17.25
No. 3 foundry	16.50 to 17.00
Gray forge	16.25 to 16.75
Malleable	17.25 to 17.75
Basic	18.00 to 18.25
*Charcoal	18.00 to 19.00
*Some grades	21.75

Finished Material.—Prices remain rigid, sales are reported quiet. There is a little inquiry for last half requirements, but the mills show no disposition to book the tonnages offered. Specifications continue to come in at the established pace, exceeding in many instances the shipments of the producers, and making the delivery situation no better than it has been for some time. The only exception to the rule, of nothing better than last quarter deliveries, is on reinforcing bars, square turned. These are now being forwarded by some interests within three to four months from date of specification. Cold rolled shafting may be had within 60 days. The jobbers continue to do a record business.

Approval on the bids for the new Hutchinson high school, Buffalo, requiring about 1,400 tons, was deferred for one week by the common council.

Old Material.—A firmer tone developed in the market during the past week, led by a stronger demand for heavy melting steel, together with a fair activity in the other lines, with the single exception of cast iron borings, which slumped from 8.75c to 9c down to 7.50c to 8c. Freezing weather has hampered the dealers in getting out material from their yards, and this has had its effect in causing firmer prices for immediate requirements. The Canadian demand for old car wheels continues. The range for the week, gross tons, f. o. b. Buffalo, is substantially as follows:

Heavy melting steel	$14.00 to 14.50
No. 1 R. R. wrought scrap	14.00 to 14.50
No. 1 R. R. and mch. cast scrap	13.75 to 14.25
Old steel axles	17.00 to 17.50
Car wheels	15.75 to 16.25
Railroad malleable scrap	13.25 to 13.75
Wr'ght iron and soft steel turn.	8.25 to 8.50
Cast iron borings	7.50 to 8.00
Low phos. steel scrap	17.00 to 17.50
Old iron rails	15.00 to 15.50
Boiler plate, sheared	15.50 to 16.00
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	11.00 to 11.50
No. 1 busheling scrap	12.00 to 12.50
No. 2 busheling scrap	10.00 to 10.50

ST. LOUIS

Pig Iron Dull—Scrap Improves

Office of THE IRON TRADE REVIEW,
St. Louis, Feb. 25.

Pig Iron.—Business remains at a low ebb, and orders are confined to small lots for prompt shipment. One sale was made last week of 300 tons of southern No. 2 and another of 250 tons of the same grade for immediate delivery. Southern No. 2 is quoted at $13.50 to $13.75, Birmingham basis, with a lower price occasionally heard of. Local agents are not looking for any immediate improvement in conditions. Northern quotations are unchanged from last week.

Prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$17.75 to 18.00
Southern No. 2	17.25 to 17.50
Southern No. 3	16.75 to 17.00
Southern No. 4	16.50 to 16.75

Coke.—There is nothing doing in the coke line, but prices are manifesting a tendency to stiffen.

We quote 72-hour Connellsville foundry grades, $3.25 for immediate shipment or delivery; prompt 48-hour Connellsville furnace, $2.50 to $2.75; contract, $3.25; best 72-hour Virginia foundry, for immediate shipment, $3.25; 48-hour Virginia furnace, $2.75. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Scrap Iron.—Conditions improved materially in the scrap market last week, and still further improvement is looked for in the near future. New orders are coming in from the railroads, and mills are running to full capacity. While it does not affect this immediate territory, the Grand Trunk system is out with a list of 2,000 tons of scrap. The Frisco, also, has a list out for 500 tons of scrap that will be closed this week, and the Chicago, Burlington & Quincy has one out that will be closed Tuesday.

Prices which dealers are willing to pay for scrap, f. o. b. St. Louis, follow:

Gross Tons

Old car wheels	$14.50 to 15.00
Old iron rails	14.00 to 14.50
Rerol'g rails (5 ft. and over)	14.50 to 14.75
Old st'l rails (3 ft. and under)	13.50 to 14.00
Light section relayers (45 lbs. and under) subject to inspec.	23.50 to 24.50
Relay'g rails, subject to inspec.	23.50 to 24.50
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.50 to 13.00
Shoveling steel	10.50 to 11.00

Net Tons

No. 1 railroad wrought	$12.00 to 12.50
No. 2 railroad wrought	11.50 to 12.00
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers, springs	10.50 to 11.00
Shafting	14.00 to 14.50
Iron car axles	21.50 to 22.00
Steel car axles	18.00 to 18.50
Locomotive tires	12.00 to 12.50
Pipe and flues	7.00 to 7.50
Tank iron and cut boilers	7.00 to 7.50
No. 1 cut busheling	10.00 to 10.50
No. 2 cut busheling	8.00 to 8.25
Cast and mixed borings	6.75 to 7.25
Machine shop turnings	8.00 to 8.25
R. R. malleable	11.00 to 11.50
Agricultural, malleable	9.50 to 10.00
Stove plates	8.50 to 8.75
Angle splice bars (iron)	13.00 to 13.50
Angle splice bars (steel)	12.00 to 12.25

Charles M. Schwab, president of the Bethlehem Steel Corporation, was in Detroit, Tuesday, the guest of the Adcraft Club and the Detroit Board of Commerce, making an address at a dinner in his honor at the Pontchartrain Tuesday evening.

BRITISH MARKET

Weakness Develops in Cleveland Warrants

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 15.

Pig Iron. — The present peculiar conditions of trade have produced surprising irregularities in prices. There has been a very sharp descent in Cleveland warrants during the week which culminated in a fall yesterday of 1s 2½d. This brings the quotation for warrants down to 63s 1d ($15.44) for cash transactions, a fall of 2s 5d on the week. Various circumstances have alarmed speculators, and inexperienced holders have unloaded with a rush. That this condition does not represent the true state of the trade, is evident from the further inroads made upon stocks, which are now reduced to 229,000 tons, a fall of about 5,000 tons from the beginning of the month. Shipments have amounted to 31,000 tons, and would have been larger but for weather difficulties, and inability to arrange suitable tonnages. The effect upon other sales of iron has been remarkably slight. The present selling figure on the East Coast is 82s 6d ($20.20) for mixed numbers.

Finished Iron and Steel. — Several circumstances have checked buying of finished material. The sheet and tin plate trades have been heavily hit by the war, while the fall in copper has reduced the tone of the market, by restricting the pace of production at the Birmingham non-ferrous mills. Nearly everybody is now adopting a waiting policy. The principal effect on prices has been in the sheet and tin plate departments. The weakest place in the former is, undoubtedly, in the group of Staffordshire mills, which cater solely for local markets; and during the week the anxiety for specifications has led to some running around for business, and consequent depression of prices. It is quite easy to get galvanized sheets at £11 17s 6d f. o. b. Liverpool, although this price, for many mills, means no profit at all. In the tin plate trade there will be a complete stoppage, shortly, for a week, of the whole of the mills in South Wales, and it is hoped this will stimulate business. Within the past five years, over 100 new mills have been started in South Wales, and though they would probably all have obtained a fair supply of business, without the war, the Balkan conflict has badly turned the scale against the tin plate maker, while the inroads of America into the Pacific markets are now rather severely felt. Bar makers are still busy, but, in a few cases, could do with specifications. The great demand for rolling stock will suffice to keep the largest works busy for some time to come. In the finished steel trade, the market is as strong as ever.

Locomotive Orders.—The Missouri Pacific railway has ordered seven superheater mountain type passenger locomotives and five superheater Pacific type passenger locomotives from the American Locomotive Co. The Detroit Terminal railroad has closed for five superheater six-wheel switching locomotives from the same builder.

METAL MARKETS

Foreign Tin Market Weak

New York

Feb. 25.

Copper.—A fair volume of business has been booked by leading selling agencies at around 15c, delivered, 30 days, for electrolytic copper, and 15c, cash, for lake. It has been rumored that other sellers were offering the metal ¼c under that level, but no confirmation of such sales, except when special conditions governed could be attained. The market appears to be established at 15c. Foreign quotations of standard copper have fluctuated between £65 and £64 since Feb. 18. Both spot and three months closed today at £64. Exports of copper since Feb. 1, aggregate 24,047 tons.

Tin.—The foreign tin market has been extremely weak during the past three business days. The decline reached a total of £6 in spot and £6 10s in futures today compared with the closing prices of a week ago. Transactions have been large in the London metal exchange. There is no explanation of this weakness other than that the uncertain character of Europe's business future, supplied material for speculations in the metal to attack values with. Spot tin closed in London today at £215 and three months at £208. The weakness of the foreign market resulted in restraining buying by domestic concessions except for immediate needs. These have been bought at around 48c, recently, and earlier in the week at 48.50c to 49c. The closing on February tin today is 47.62½c. March is 47.22½c, and April is 46.70c. Arrivals since Feb. 1, aggregate 3,680 tons and there are 3,320 tons afloat.

Lead.—This market shows remarkable strength in the face of the general weakness in other metals. Producers are able to attain business at from 4.30c to 4.35c in New York, for all positions up to May 1.

Spelter.—The supply of spelter continues in excess of demand, and only the best brands command more than 6.30c in New York, for February and March is down to 6.25c.

Antimony. — All grades are freely offered at concessions by dealers who have been carrying the metal for some months. Cookson's is 9.37½c; Hallett's is 9.12c, and other brands 8.25c to 8.50c.

Chicago

Feb. 25.

New Metals.—The market for new metals continues weak, copper having fallen slightly during the past few days. The only particularly strong point in the market is spelter, which exhibits a slightly firmer tone.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 15c; casting, 14⅝; smaller lots, ¼c to ¾c higher. Spelter, car lots, 6.15c; lead, desilverized, 4.25c; sheet zinc, 8.50c, **f. o. b.** La Salle, in car lots of 600-pound casks; pig tin, 48.62c; Cookson's antimony, 9⅜c; other grades, 8⅜c.

Old Metals.—An entire lack of activity is apparent in this market, reflecting the conditions of the market for new metals. Quotations are greatly unsettled and buyers are covering only for their immediate requirements.

New Weight Card.—The American Sheet & Tin Plate Co. has issued a new formed products weight card which covers standard weights per bundle, number of sheets per bundle, standard weights per square and covering capacities. The new card will be received with much interest by the trade.

Electric Power from the Mississippi-I

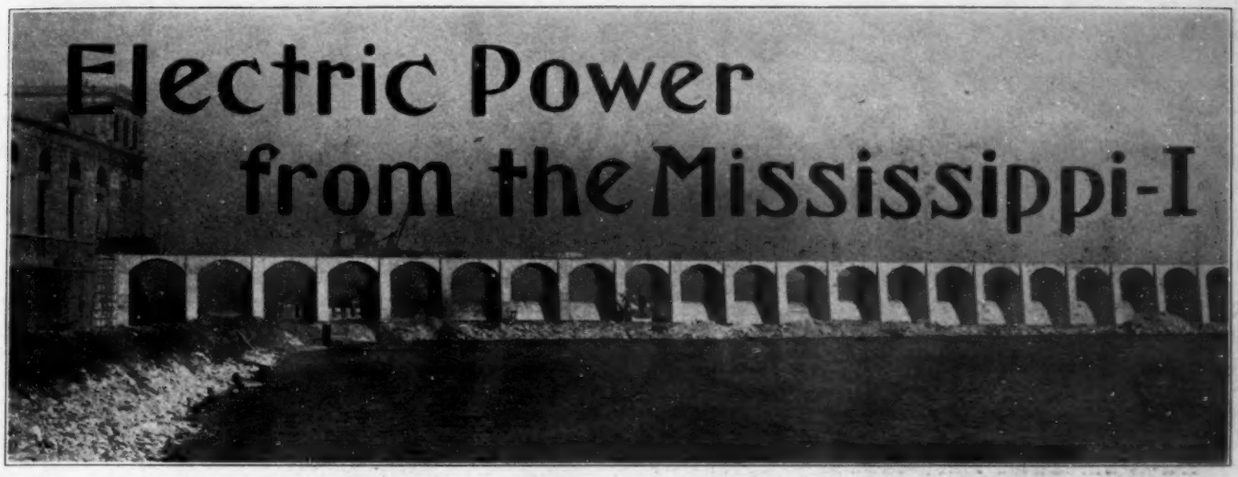


FIG. 1—A PORTION OF THE COMPLETED DAM WITH SPILLWAY SECTIONS IN PLACE

Keokuk Hydro-Electric Development

A construction project which involves in its execution laying 650,000 cubic yards of concrete and the consumption of over 7,000 tons of structural steel, and which has for its purpose the development of over 300,000-horsepower by damming the Mississippi river and installing 30 hydro-electric units of unprecedented size, must be of interest to business men, engineers, capitalists and others concerned in the industrial development of the country. Such a plant is now being built at Keokuk, Ia., by the Mississippi River Power Co.

The entire development, the general features of which are illustrated in Fig. 3 and also in the plan, Fig 7, comprises the following three important features: A spillway, bridge type dam extending 4,694 feet from the east (Illinois) side of the river; a power house, 1,718 feet long parallel with the river and extending downstream from the end of the dam on the Iowa side; and a short dam with navigation lock connecting the lower end of the power house with the Iowa shore. The short dam forms the forebay for the power house and also includes a drydock adjacent to the lock.

The main dam consists of a series of 119 arched spans with piers, 6 feet thick and spans of 30 feet, inside. The spillway sections are, therefore, each 30 feet long and 32 feet high. The structure is 29 feet wide on top, sufficient for a double-track standard gage railway, and 42 feet at the bottom. The power house is a concrete monolith and is designed to contain 30 vertical, special Francis type turbo-generator units of 10,000 normal horsepower. Only 15 units are being installed at the present time; the remainder will be added as the demand for power increases. Eight of the turbines ere furnished by the I. P. Morris Co., Philadelphia, and seven by the Wellman-Seaver-Morgan Co.,

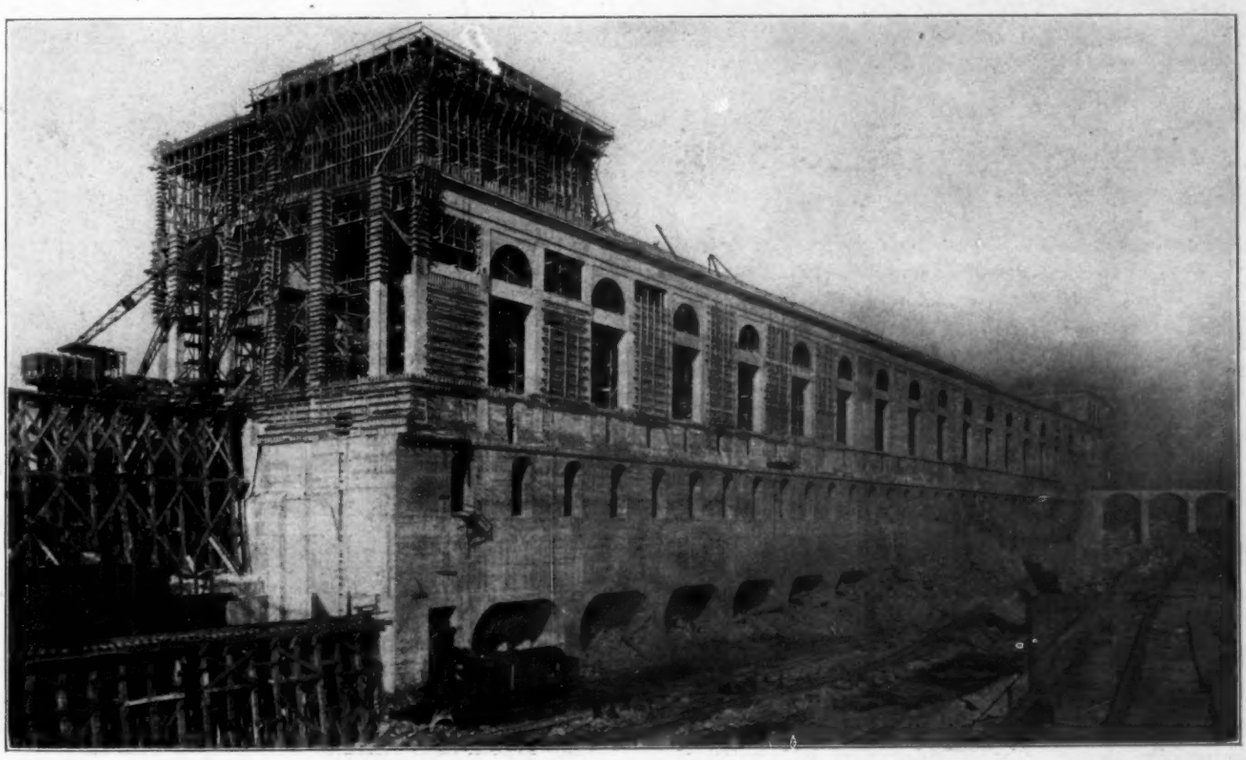


FIG. 2—EXTERIOR VIEW OF THE POWER HOUSE UNDER CONSTRUCTION

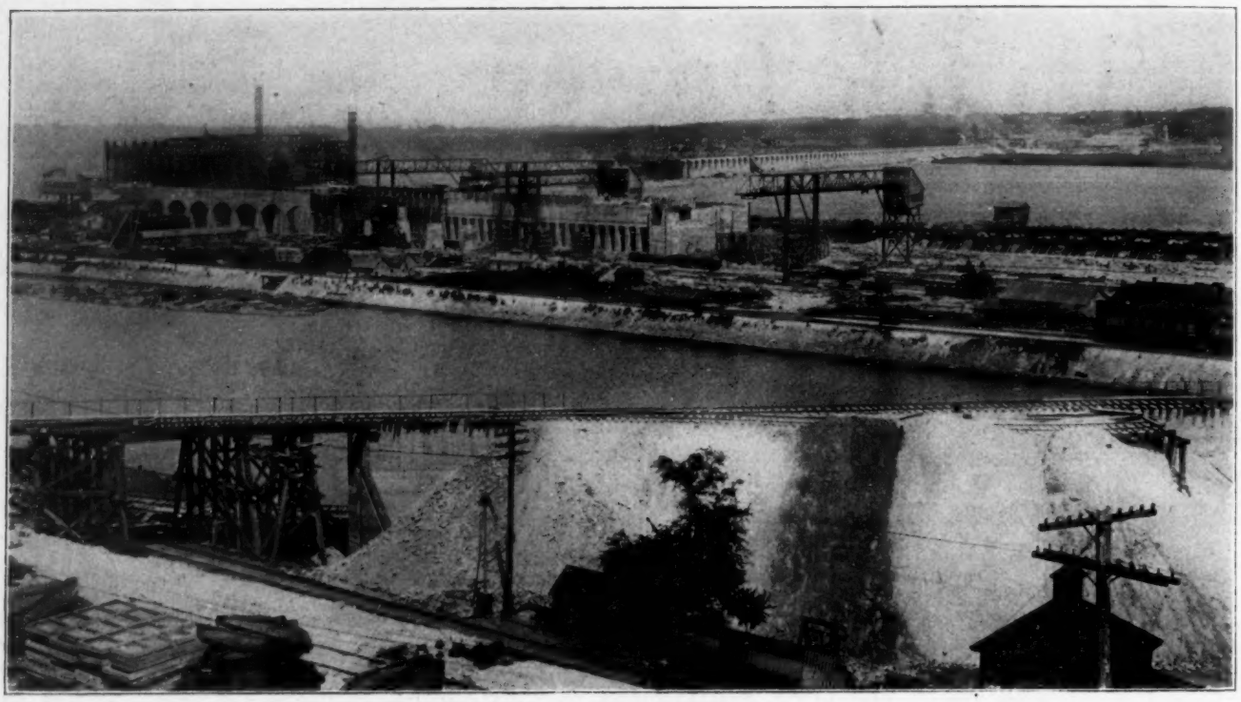


FIG. 3—GENERAL VIEW OF THE POWER HOUSE AND DAM FROM THE IOWA SIDE

Cleveland. The generators, which are designed for a normal output of 7,500 kilowatts each, at 11,000-volts, three-phase, were all built by the General Electric Co.

The navigation lock is 400 feet long and 110 feet wide with a 40-foot lift and the drydock is 115 x 463 feet; both are fitted with massive steel gates to be operated by compressed air. The power for the operation of the lock and drydock machinery will be generated by a special installation of turbines. The lock, drydock and appurtenances are being built by the Mississippi River Power Co. at its own expense and will be deeded over to the United States upon completion. The new lock will pass a steamer in from 10 to 15 minutes, and will reduce the time required to navigate the Des Moines rapids by over two hours.

In addition to the features mentioned, the power company is constructing a concrete ice fender, 2,325 feet long, to protect the forebay in winter and is building a seawall 1,110 feet in length and from 45 to 73 feet high to protect the tracks of the Chicago, Burlington & Quincy railroad, along the Iowa shore, from high water. The dam will create a quiet lake with a minimum depth of 8 feet, extending 60 miles up the river above Keokuk. Twenty-five miles of macadam highway are being constructed around the lower end of the lake by the power company. Since

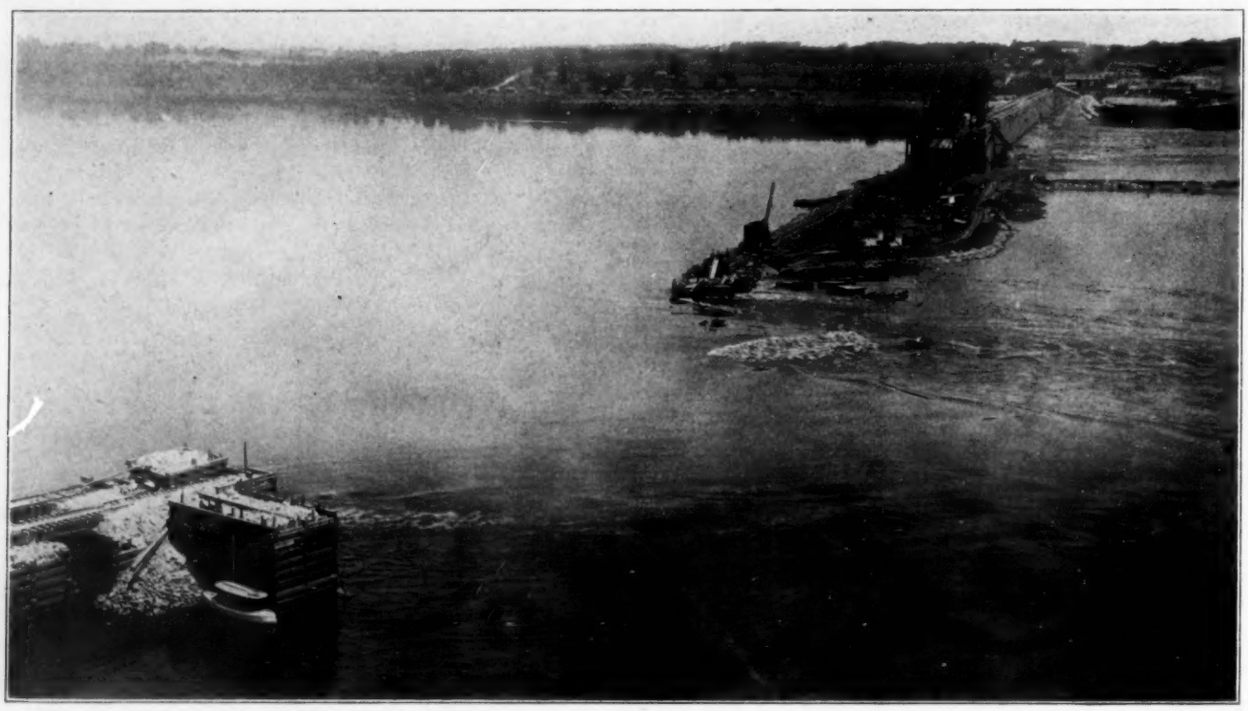


FIG. 4—THE DAM UNDER CONSTRUCTION, SHOWING THE TEMPORARY COFFER DAM

the plant is being built in a navigable stream, all the plans must be approved by the chief of engineers of the war department. One reason for the unusual massiveness of everything connected with the dam and power plant is found in the low head available, which necessitates the employment of large units to obtain the requisite power. The normal head is only 32 feet, but will range from 20 to 39 feet, depending on the stage of the river.

All of the work is handled by direct administration, none of it having been let to contractors. About 2,500 men are employed. Before anything could be done, a large construction plant had to be assembled; this involved an initial outlay of about $1,000,000. To gain some idea of the immensity of this one feature of the project, it may be said that the construction plant includes 15 miles of standard gage railroad track with 60-pound rails, 16 locomotives, 142 cars, 10 derrick cars, three steam shovels, seven 10-ton stationary derricks, nine concrete mixers with a daily capacity of 3,500 yards, stone crushers of equal capacity, 50 miles of iron pipe, 44 steam boilers of 3,755 aggregate horsepower, centrifugal pumps with a capacity of 32,660 gallons per minute, air compressors capable of handling 6,761 cubic feet of free air per minute, 10,000,000 feet of lumber and 1,250 tons of structural steel for concrete forms. In all, over 6,000 different articles were bought ranging in variety from a few bolts of odd size to 11 automobiles, before a stroke of work was accomplished on the construction of the plant proper.

Gigantic Undertaking

When the plant is completed and delivering power to consumers it will represent a total cost of approximately $22,000,000, on which the fixed charges including depreciation, interest and taxes will be close to $2,860,000 a year.

Not the least important feature to be considered in a proposition of this character is the financial economy, choosing in every instance the thing that will result in an ultimate saving, without regard to the number of dollars saved at the particular moment. This accounts for the expenditure of $1,000,000 on the construction plant—on tools, in a large sense—before proceeding with the real work at hand. This same problem is constantly recurring. In one instance it had to do with the substructure of the power house in connection with the second installation of 15 units. The question was whether to build the whole power house up to its floor, above the new water line, while the coffer dam and facilities are in place, or to do it later when needed, in a new coffer dam. Calculation showed that the interest on the cost of the substructure was more than the cost of building another coffer dam. Hence only a solid wide wall, which later will be the west side of the lower part of the power house, is being built now to connect the upper half of the power house with the lock.

To attain the highest efficiency possible, considerable attention was devoted to the organization of the work. The topography and size of the area covered made it practicable to divide the construction work into two entirely separate divisions, each under the immediate charge of a superintendent. One of these is called the Illinois division, its plant being located on the east side of the river; the other is known as the Iowa division and it is entirely on the west side of the Mississippi. The Illinois division is building the dam proper extending from the Illinois bluff across the river to join the power house. The Iowa division is building the power house substructure, the turbine installation, the lock, the dry dock, the sea wall and the entire hydraulic part of the development on the west side of the river. All of the parts of the various structures named are designed and planned by

FIG. 5—A PORTION OF THE POWER HOUSE BEFORE THE WALLS WERE ERECTED, SHOWING THE ROW OF WATER WHEEL PITS

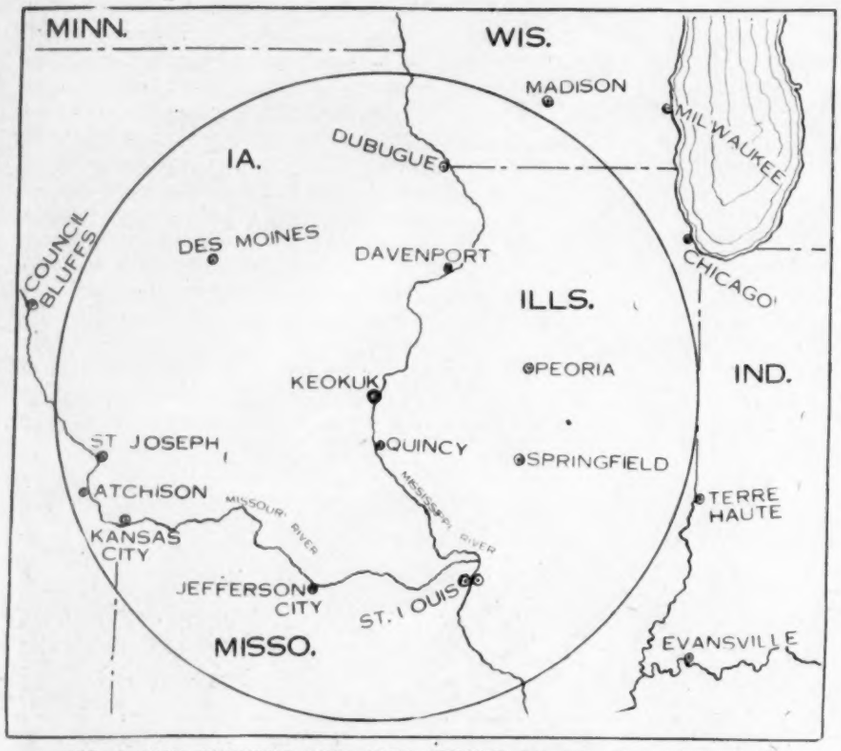


FIG. 6—MAP SHOWING THE AREA SERVED BY THE KEOKUK PLANT

the company's engineering department under the direction of the chief engineer. The electrical work, and its correlated parts, is being executed by the Stone & Webster Engineering Corporation, of Boston.

History of the Project

The Keokuk plant is the result, largely, of the personal efforts of Hugh L. Cooper, an eminent hydraulic engineer, but before he came on the scene, the matter had been agitated in public and privately for two generations. The first real surveys were made in 1848 by Robert E. Lee, subsequently commander of the armies of the Confederacy, but at that time a young engineer officer in the service of the United States. He reported that the scheme would not be practical until the surrounding country was settled and until engineering science had surmounted the obstacles that then stood in the way of efficiently utilizing the power. But the people could not appreciate the soundness of Lieutenant Lee's advice and 60 years was wasted in fruitless attempts to accomplish what has now been realized. All kinds of schemes were projected, with all kinds of people behind them. There was Joseph Smith, prophet of Mormonism, murdered before he had time to move far, and there was strong, erratic Zebulon Parker, an inventive genius who lost his fortune in his efforts to construct a wing dam that would resist the ravages of flood and ice. Parker was followed by a man named Gates, whose dam met with equal disaster. The final effort was made by the citizens of Hamilton, Ill., and Keokuk, Ia., when they formed a little water power company in 1899 and raised $2,500 by the sale of stock. The power company formed, they asked the councils of their respective towns to subscribe $7,500 additional, and with this $10,000 in hand they secured a franchise to build a dam across the river. The corporation is known as the Keokuk & Hamilton Water Power Co.

How the Capital was Obtained

About ten years elapsed and then Mr. Cooper became interested in the project. Through his efforts and with the co-operation of the Stone & Webster syndicate, the capital necessary for the present work being executed by the Mississippi River Power Co. was obtained. It was subscribed for in comparatively small lots, 35 per cent in the United States and 65 per cent in foreign countries—Canada, England, France, Germany and Belgium chiefly. The dam is being built on the authority of the original franchise obtained by the Keokuk & Hamilton Water Power Co., which has been taken over by the Mississippi River Power Co. The money advanced by the cities of Keokuk and Hamilton has been returned to their respective municipal treasuries.

Some of the commercial features of this great project are illustrated by the map, Fig. 6. The location of Keokuk is indicated by a heavy dot on the Iowa-Missouri line; the large circle taking in St. Louis and Des Moines encloses approximately the area within which the power may be economically transmitted. This circle is about 440 miles in diameter and

FIG. 7—PLAN OF THE KEOKUK PLANT

includes a population of over 5,000,000, according to the census of 1910. It will be noted that the immense power consuming area immediately surrounding Chicago is within striking distance of the Keokuk plant, although there are no intentions at present to build a transmission line in this direction.

Nearly all of the previous water power development in the United States has been on the edge of the country, from California along the Canadian border and down the Atlantic coast to the Carolinas, thence across Georgia and Tennessee to Alabama. The Keokuk plant is the only very large development in the heart of the nation. In size it exceeds the development in any one state except three, New York, Maine and California, by the latest census reports, and is about half the total of all five companies at Niagara.

Power to be Developed

A total of over 300,000 horsepower will be developed, 310,408 to be exact, but the first installation of 15 turbines will have a normal capacity of only 150,000 horsepower. Allowing for transmission losses and reserve, it is expected there will be 120,000 horsepower available for sale before the close of the summer. Of this quantity, 60,000 horsepower has been sold on a 99-year contract to the Union Electric Co., St. Louis, which will retail it through the usual channels.

The new plant is located adjacent to the cheapest steam coal fields in the country and it will, therefore, be necessary to sell the power at low figures. At the present price of coal, the cost of power produced in isolated steam plants varies from $24 to $50 per horsepower-year, the lower figure being for modern plants with comparatively large units operating condensing. It can be definitely stated, although the actual rates have not yet been fixed, that the electrical power will be sold at prices ranging from $20 to $25 per horsepower-year.

At present the Mississippi River Power Co. is developing the territory within its reach in a lineal instead of in a radial direction; that is, only two transmission lines are being built, one up river to Burlington and the other down stream to St. Louis. The reason for this is obvious from considerations of economy, since the two transmission lines now building reach the largest number of power consumers at minimum expense, and the cost of covering the entire circle at the outset by radial lines would be prohibitive. Also the power company intends to do a wholesale business only, leaving the retail distribution to consumers to separate or subsidiary concerns. Therefore, the parent company will consider propositions from other companies that may wish to build transmission lines to the west or east, tapping the main lines between Burlington and St. Louis or the central plant at Keokuk.

The total length of the main transmission lines is 180 miles, it being 137 miles from Keokuk to St. Louis and 43 miles from the same point to Burlington. The Burlington line is aluminum and the St. Louis line is copper. Both lines are constructed on private right-of-way, 100 feet wide; they are built in duplicate and the usual precautions have been taken to avoid interruptions to the service by lightning or other causes. The transmission voltage is 110,000, with one exception the highest in the country. This figure was adopted to reduce the line drop to a minimum and to increase the economical radius of transmission. The energy loss between Keokuk and St. Louis will be 9 per cent. Twenty-five cycle 3-phase current is to be furnished, and while this frequency is ideal for most power purposes, it is often unsatisfactory for lighting and it is probable that frequency changers will be found desirable at several points.

The principal cities which will be served by the new plant include Keokuk, Montrose, Fort Madison and Burlington, Iowa; Warsaw, Hamilton and Quincy, Illinois; and Hannibal, Louisiana, Old Monroe, and St. Louis, Missouri. Current also will be delivered to the various suburban towns surrounding St. Louis on both sides of the river. Within this region the total manufacturing development at the present time is well advanced. The problem of the power company is therefore not that of opening up a new country, but rather to convert large users of coal to the purchase of electricity.

Great Industrial District

However, it is expected that the Keokuk plant will induce the establishment of a large number of new industries within the region affected. The extent to which this development may take place may be estimated by a study of the statistics showing the present development. In a radius of 150 miles from Keokuk there are 5,988 factories, according to the latest available census. These plants represent a total capital of $530,289,000, and their annual production is valued at $625,463,000. In these figures the iron, steel, and machinery industries are well represented, specially in St. Louis, Hannibal, Quincy and Burlington. Organized efforts are being made by the various towns and cities affected to encourage the establishment of new enterprises within the power zone.

In order to be ready for the operating stage of the enterprise, the Mississippi River Power Co. is already perfecting its permanent organization. Edwin S. Webster, of Boston, is president, and Hugh L. Cooper, vice president and chief engineer. In immediate charge of the operating department is J. A. Trawick, manager, assisted by R. W. Child. The industrial department is in charge of J. A. McKinney; N. P. Wilcox is sales manager, and C. H. Harris, resident engineer.

Engineering works rarely receive much attention on the part of the public, but the work at Keokuk forms a local attraction, the people of the surrounding country having a popular interest in the project, which has been in the public eye for many years. In fact, excursions are run from near-by points to Keokuk, with the dam as the main objective. To meet these conditions and still provide for excluding the public from the works, the power company has erected on each side of the river a covered pavilion or observation platform, which is provided with seats and from which there is a very good view of the work, as well as of the scenery along this part of the river.

Canadian Metallurgical Laboratory

The results accomplished by the Canadian department of mines in its experiments in ore dressing and concentration are of particular interest to many Canadian districts in which large deposits are found of low grade iron ore. While it is difficult for the Canadian furnaces to obtain sufficient quantities of high grade ore, at the same time immense deposits of low grade ore are available as soon as means for concentration and elimination of impurities is made commercially available. In many cases, sulphur, phosphorus and titanium are present in excess and in the raw state, the ores are valueless.

During the past year, the department of mines has made experiments on iron ores from the provinces of Ontario, Quebec, New Brunswick and Nova Scotia. In these experiments Grondal magnetic separators have been employed. The aim has been to treat the ores under conditions which approximated commercial practice.

The Valuation of Iron Ore Mining Properties[1]

An Interesting Comparison of the Base Values of Lake Superior, Cuban and Brazil Ores at Pittsburgh and Points East of That District

By James R Finlay

At first blush one is tempted to say that iron mines are like any other mines, and that principles governing mining property in general will apply to them. But there are certain considerations which seem to repay reflection. Gold and copper are more or less independent of transportation. The proof of this is that those metals are profitably mined and shipped from the remotest corners of the earth. Their value is determined by the cost of production on the ground. This is quite true of gold, not quite so true of copper, not at all true of iron. If New York were a fishing village and Chicago a swamp, Calumet & Hecla might still be a bonanza. The main element of its value is the 60 pounds of fine copper per ton which it produced for years. But the Mesabi range is absolutely dependent upon the industrial activity in the United States. Iron manufacture in Europe would give it no value whatever.

Hoover's System

I have already referred to some differences in the problem of mining as between the more precious metals, but it is interesting to note that the literature of the economics of mining has come mainly from men who have been thinking of gold. Our present ideas of mine valuations were mainly originated by H. C. Hoover, whose point of view was almost strictly at that time that of an English investor in gold mines.

The cardinal principle of Hoover's system of valuation is that the value of a mine is a capitalization of future profits. Given the margin of profit in an ore, the amount of ore, and the time required to get the profit, the value is merely that profit as it will appear in a series of dividends discounted back from the future date of payment. I most heartily subscribe to this principle and believe it to be the only one worth considering; but, like every other general principle, it is only the starting point for many complex deductions. For example, an ore which is not marketable at all today may be in demand 20 years from now. It would be foolish to apply Hoover's principle to support an argument that because an ore has no present market it has no present value.

The fact is that the conception of profits depends on

1.—The value of an ore; that is, its average price.

2.—The average cost of getting it out and getting it to a final market.

3.—The amount of ore and the rate of getting it out.

Application of Valuation Factors

When we consider how these factors apply to different kinds of mines, we find that with gold mines the first factor presents no uncertainty whatever. Gold is not only marketable at a fixed price, but in unlimited amounts. The gold miner does not have to consider either how much of his product he can sell or what he will get for it. Inasmuch as his gold commands a fixed market, so his gold ore is always in the market. He immediately transfers his attention to the quality and quantity of it. Now, if gold were not hard to find, gold ore would not have an unlimited market. Therefore, the prime uncertainty is the ore itself. In spite of the fact that development is carried on as fast as possible in the average gold mine, the amount of ore is usually the principle subject of uncertainty. Once mining is successfully established, the cost is practically determined; so that almost the whole matter of valuation is the life of the mine.

If we turn our attention to iron ores, we find ourselves confronted with different circumstances. Omitting discussions of properties in the prospecting or developing stage, which have little or no influence in the markets of the world, we find that iron ores of good grade are known in immense quantities running up into billions of tons. Therefore, the question is not primarily the supply of ore. The main questions are decidedly the price at which it can be sold and the amount that can be marketed each year. In valuing iron mines in comparison with gold or copper mines, we transfer our chief uncertainties into quite a different channel.

I have asserted that in iron mines an error of 10 per cent in estimating the average price of an iron ore will often make far more difference in the valuation than any possible mistake as to the life of the mine. I do not wish to minimize or to ignore the life factor either, because in the case of many iron properties the amount of ore yet to be discovered in the ground will be very great. Nevertheless, in almost every mine of importance, the uncertainty as to to the ultimate production of ore is confined between certain limits. What I wish to emphasize is, that with most of such mines the difference in valuation caused by using the minimum estimate of ore or the maximum estimate of ore upon the property will not be so great as the difference produced by a variation of 10 per cent in the price to be received for that ore at the blast furnace.

This fact has been quite clearly recognized in discussion of the valuations which I made in my report to the tax commissioners of Michigan. Almost immediately after this report was published, the price of iron ore declined 10 or 12 per cent below the average I had counted upon. During the past year I have come to see the crucial importance of this question of price and have given it much attention. I have tried to obtain some logical idea of the basic factors which will determine the price of iron ore in a given field.

Computation of Average Price

Computations of an average price for the future, based upon the price for the past, must be unstable and in a measure contradictory according to the number of years of past experience taken to establish the average. There have been periods of high prices and other periods of low prices. A 5-year average will be one figure and a 20 year average will be another figure. After all, the selection of a price even in the light of experience, if not actually a matter of guesswork, must be a matter for the exercise of judgment. It is not a thing which is mathematically certain.

Let us try to work out, on other grounds, an idea of the limits within which prices may fluctuate under the pressure of competition. For conven-

[1]From a paper presented at the February, 1913, meeting of the American Institute of Mining Engineers.

ience and to get a concrete illustration to argue about, let us have in mind the Lake Superior mines.

The factors which I will take to be vital for any iron ore field are the following:

1.—Ores that are pure enough to be inherently desirable for iron smelting and manufacture.

2.—A great volume of such ores, sufficient to warrant the great investment of capital in the steel business. This naturally demands a firm foundation in assured ore supply.

3.—The assurance that such ores can be supplied within the industrial field to which they belong at least as cheaply as ores from any other source.

Industrial Field for Lake Superior Ores

Lake Superior iron ore goes into an industrial field of the first magnitude. It is rivaled only by a similar field in Europe which comprises roughly the middle third of Great Britain and a tract on the Continent covering Belgium, northern France and western Germany. The American field is a rough ellipse, the axis of which runs from Philadelphia to Chicago and whose sides are Lake Erie on the north and the south boundary of Pennsylvania on the south. The major axis is near the path described by the American center of population in its progress westward. That center has reached a point in Indiana, not very far southeast of Chicago. Pittsburgh is about the middle point in the whole field. A moment's reflection will show that this area is precisely that area which has the closest contact with the main portion of the population of the United States and Canada; that since the densest part of the population is east of the center of population, so the most active industrial area is naturally east of it; that the area is best situated geographically for economical distribution to the bulk of consuming demand, for all kinds of manufacture. Lake Superior iron ore enters this region from the north and there meets its necessary complement, the great fuel supply from the Appalachian coal field, which lies just to the south.

It is little wonder that this area has become preponderant in iron manufacture; that it accounts for from 80 to 90 per cent of the whole iron business of the country.

Now, I invite attention to this inference: If Lake Superior can meet any competition as far east as Pittsburgh, it is bound to supply half of the iron used in this field. If it can meet outside competition all the way to the coast, it is bound to supply nearly the whole demand. I propose to argue on this basis. I propose to leave out of account the extraneous or gratuitous factors of taxes, royalties, and profits, which are merely consequences allowed by the natural advantages which these ores enjoy, and to consider only the fundamental factors of cost of mining and distance of transportation (*a*) by land, and (*b*) by water, of these lake ores against any known or likely rivals.

Present metallurgical practice seems to be to treat the Old Range ores as an accessory to Mesabi ores, using them as a desirable mixture. The proportions are about 70 tons of Mesabi to 30 tons of Old Range. As near as I can make out, the average mining cost of all these ores, omitting taxes, is about 60 cents a ton for Mesabi (largely steam shovel) and about $1.50 for the others (all underground). These costs include everything except initial plant. The mixture figures 87 cents a ton. The average iron content of these ores I believe to be about 52 per cent natural. This means that the average mining cost is 87 divided by 52 or 1.67 cents per unit.

Let us take this ore to Pittsburgh as the central point of the manufacturing field; 70 per cent has a land haul of about 80 miles to lake, and 30 per cent has a land haul of 37 miles; the average is 68 miles; 70 per cent has a lake haul of 850 miles and 30 per cent has a lake haul of 650 miles; the average is 790 miles. From Lake Erie to Pittsburgh all ores have a land haul of 160 miles. This aggregates a land haul of 228 miles.

Cost of Ore at Pittsburgh.

The all-lake haul is over the protected waters of inland lakes. Land haul appears to average at present about 0.66 cent per ton-mile; lake haul about 0.09 cent per ton-mile. Applying these figures, the costs at Pittsburgh will aggregate the totals given in Table I.

Now let us consider some competitors. Cuba can produce 1,000,000,000 tons or more of iron ore, which, when roasted, or nodulized, will also contain 52 per cent of iron. The ore is all low in phosphorus and contains 0.75 per cent of nickel. These factors will, I believe, make it a formidable rival. I will count in the Bessemer differential, but because the nickel is not yet established as a premium factor, we will neglect that, except to consider the nickel as so much iron:

Table I.

COST OF LAKE SUPERIOR ORE, AT PITTSBURGH.

	Cents per unit.
Mining, 87 cents per ton	1.67
Land haul, 228 × 0.66 = $1.50 per ton	2.89
Lake haul, 790 × 0.09 = 0.71 per ton	1.37
	5.93

Lake ores are sold on the basis of four standard grades, as follows:

	Natural iron (undried), per cent.	Iron, (dry) per cent.	Phosphorus, per cent.	Moisture, per cent.
Old Range Bessemer	55	61.12	0.045	10
Mesabi Bessemer	55	61.12	0.045	10
Old Range non-Bessemer	11.50	58.52	.....	13
Mesabi non-Bessemer	51.50	58.52	.....	12

For Bessemer ores a premium is allowed for phosphorus less than the standard.
For all ores allowances are made for iron contents varying from the standard.
Silica is also carefully taken into account.

Ore is one-third Bessemer. The Bessemer quality is worth 50 cents a ton additional; say, for the average, 17 cents additional	0.33
Total base value	6.26

Table II.

	Cents per unit.
Cost of mining, say, 27 cents per ton, 40 cents nodulized	0.75
Nodulizing, $1	1.89
1,200 miles sea haul at 0.09 = $1.08 per ton	2.04
375 miles land haul at 0.66 = 2.70 per ton	5.09
Total cost	9.77
Value of Cuban—Lake Superior base cost	5.93
Add Bessemer quality, 70 cents per ton	1.34
(I estimate Lake Superior Bessemer at 0.45 phosphorus. Cuban ore is much lower, 0.25, and for this commands a premium.)	
Total base value	7.27
Differential in favor of Lake Superior	2.50

This is equal to $1.30 per ton at Pittsburgh.

The only other field which can figure in billions of tons is Brazil. Let us appraise its factors. The ore fields are in the tropics in a mountainous country, 380 miles from the sea, with plenty of rain. Rail haul will cost more than in the Lake Superior region, but let us ignore that. Let us take mining at any figure, say 25 cents a ton, and let us take the ore to be 62 per cent of Bessemer natural.

	Cents per unit.
Its base value will be.....	5.93
Add Bessemer quality (Phos. 0.045)	1.00
Total value	6.93
Its cost will be:	
Mining, 25 cents per ton.....	0.40
Land haul, 730 miles at 0.66, 4.82 per ton	7.77
Sea haul, 5,700 miles at 0.09, 5.13 per ton	8.27
Total cost	16.44
	6.93
Differential in favor of Lake Superior	9.51

This is equal to about $5 per ton of Lake Superior ore.

There is bound to be a point where Lake Superior will meet both Cuba and Brazil on equal terms. This point will be, in terms of land haul, that distance east of Pittsburgh where its freight will equal half the differential in favor of the Lake Superior ores which exists at that point. In the case of Cuba that differential is $1.30 per ton. One-half of that is 65 cents. In terms of freight at 0.66 cents per ton-mile, this means 100 miles. Cuban ores, therefore, will meet Lake Superior ores at that point on even terms and east of that place they will have the advantage. Very roughly, this gives to Cuba about one-quarter of the manufacturing field. I see no reason why Cuba cannot establish for that proportion of the industrial field substantially the same position which the Mesabi Range has in the Lake Superior field; that is, it can furnish, say, 70 per cent of the iron.

In the case of Brazil, the differential is equal to about 388 miles land haul east of Pittsburgh. Brazil cannot, therefore, compete even on tidewater. At that point Cuba has a differential of 7.73 cents a unit, or $4.10 per ton, over Brazil.

Initial Plant Cost

Another factor is difference in initial plant cost at the mines. I believe this factor to be in favor of Lake Superior, because the cost of a nodulizing plant per annual ton is probably greater than that of the average Lake Superior mining plant; but I do not think that this will make a difference of more than a few cents, probably 5 cents a ton. It must be remembered that docks, boats, railroads, etc., are transportation factors, and I believe they are nearly identical for the two fields. If Atlantic boats cost more per carrying ton they can work 12 months a year, against 7 months of the lakes.

In both fields some properties are at an advantage or disadvantage, as the case may be, compared with the grand average used in this comparison. In Cuba I have allowed a railroad haul of 25 miles. Some properties will not have this. On the whole, I see nothing to vitiate the conclusion that Cuban ores have a basic advantage up to a point 100 miles east of Pittsburgh without the tariff, and 125 miles east of Pittsburgh with the tariff.

Influence Upon Prices

It should be evident from the foregoing that Lake Superior ores are firmly established in the greater part of our American iron manufacturing field. The only possible competition that appears to be important is that from Cuba, and even that is only incipient. Even if Cuban ores do come in to displace Lake Superior ores in one-quarter of this field, the total effect on the lake markets is likely to be inconsiderable. In the first place, the demand for iron and steel in America is expanding, and the need for ores is increasing at the rate of at least 25,000,000 tons each decade. The importation of from 8,000,000 to 10,000,000 tons a year of these Cuban ores will seem a bagatelle in the development of the next 10 years, and they cannot be brought into the market at a rate fast enough to influence the market greatly.

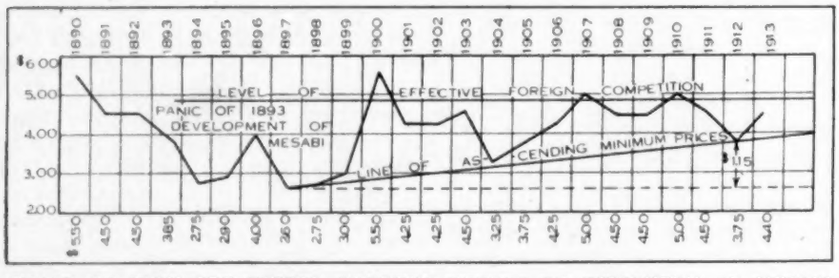


CHART OF IRON ORE PRICES, SHOWING EFFECT OF DISCOVERY OF MESABI IRON RANGE AND PANIC OF 1893. PRICES ARE FOR OLD RANGE BESSEMER

It seems fair, therefore, to conclude, that the differential in favor of the Lake Superior ores at Pittsburgh, which seems to be a central and representative point for the whole field, is about $1.30 per ton against the nearest competition; that in spite of any possible introduction of outside ores into the eastern part of the field, the total demand from the Lake Superior mines is sure to increase instead of diminish, and that even now the price of the Lake Superior ores is governed more by competition from within than by competition from without.

It has always seemed to me that the discovery of the Mesabi range introduced into the Lake region a period of intense internal competition on a scale not likely to be repeated, and under circumstances not likely to be repeated. At that time the Mesabi was like a foreign field, rudely replacing the established producers, and making them fight for their lives. The Old range mines had shipped in 1890 and 1892 nearly 10,000,000 tons a season; but in 1893 and 1894 the demand from the whole field was only 7,000,000 tons a year. With a lessened demand, the supply was being increased by leaps and bounds by enormous discoveries of fine ore which could be mined by steam shovels. These circumstances all concurred at a time of universal low prices. Every staple of commerce reached its record point of cheapness about 1894; after that time a rising scale of prices set in which has continued to the present day.

As soon as the disturbance produced by the appearance of the Mesabi range could adjust itself, the price of Lake Superior iron ores began to reflect more and more their natural advantages. I have believed that an estimate of their future price should be based upon their fluctuations since the time when the untoward conditions, just described, as not likely to be repeated, had disappeared. If we had another Mesabi on the horizon I should try to take it into account; but as such a phenomenon appears to be less and less likely, I think it logical to believe that iron ore prices will crowd more and more closely to the level allowed by grand-scale competition from foreign fields.

As an interesting commentary upon these considerations let us take the course of prices since 1890. The Old range Bessemer ores will serve this

purpose, although it should be noted that these ores do not represent the average Lake ore considered. The yearly prices at Cleveland are shown in the accompanying illustration.

The value of these ores at Pittsburgh, reasoned out according to their basic factors in competition, I calculate as follows:

	Per ton.
Iron value, 55 units at 5.93 cents...	$3.26
Bessemer quality	.50
Premium for texture	.25
Differential over Cuban ores.....	1.38
Total competitive value at Pittsburgh	$5.39
Less freight from Cleveland.....	1.00
Base value at Cleveland.....	$4.39

Since the competition is based upon the bare operating cost of Cuban ore, with no allowance for commissions, duty, amortization of nodulizing plant, royalties, or profits, it is plain that this base price is not a commercial basis of competition, but a price at which Cuban competition will be impossible in the Pittsburgh field. If we may believe that Cuban producers might be willing to assume all these costs for a margin of 50 cents a ton, which seems narrow enough, we are forced to conclude that the competitive level for this grade of ore at Cleveland is about $4.90 per ton.

The actual average of prices from 1897 to 1913, inclusive, is $4.10 per ton. The average of lowest prices on the accompanying chart for the years 1897, 1904, and 1912 is $3.20 per ton. But each succeeding cycle of low prices has not been so low as the preceding one. The low price of 1912, $3.75, was $1.15 per ton higher than the low record of $2.60 in 1897. Furthermore, we see that the average price for the 17 years has been 90 cents a ton higher than the sloping base level of lowest prices. It seems legitimate to believe that average prices have actually advanced $1.15 per ton between 1897 and 1912; that in 1897 prices were fluctuating above a minimum of $2.60 per ton and in 1912 above a minimum of $3.75; that if the real average is 90 cents a ton above the low average of a period of years we might as reasonably calculate that $4.65 is an average price for these ores in 1912 as that $3.50 was an average during the late nineties. As a matter of fact, the average for the seven panic years, 1893 to 1899, inclusive, was only $3.12 per ton.

Present Price Average.

In 1911, I based my estimate of the ruling price for these ores on a 7-year period, 1904 to 1911, inclusive, and obtained a figure of $4.50. I adopted this figure for my valuations, thinking that those years represented both good and bad commercial conditions covering about the same number of years before and after the panic of 1907. It has been hard to feel that this was good reasoning, especially facing the fact that prices dropped after 1911. Nevertheless, an average obtained by using the seven years ending 1911 or 1912 would yield the same figure. The considerations enumerated in this article have fortified me considerably in the belief that the figure I adopted in 1911 was reasonable, after all. I now think that the logic of the situation points to a price of between $4.50 and $5 a ton for Old range Bessemer at Cleveland, and that prices either lower or higher will only be temporary. These figures I believe are trustworthy as long as transportation rates remain on their present basis. Foreign ores can only disturb the equilibrium by means of lower freight rates.

The Value of Money.

It has been urged that money employed in mining should be allowed a high rate of interest because of the extraordinary uncertainties of the business. While I do not wish to dismiss this contention cavalierly, it seems to me that about all there is to say on this point is that a valuation is logical only on the assumption that the factors used in making it are correct. If such factors are judiciously taken they are as likely to err on one side as on the other, as likely to exceed as to fall short, consequently there is no need of counting on any further doubts than such as are inherent in all human enterprises. I have generally assumed that 5 per cent was a normal interest, or discount rate. If that is so it is a figure to use in a mine valuation, which should be nothing but a candid inquiry into the present value of expected profits.

For the benefit of those who have not followed discussions of mine valuations I will explain that the question of interest rate in valuation is this: The mine being of limited life, the purchaser is entitled to get his money back, plus interest, during the life of the mine out of dividends or profits. Each dividend is supposed to be an installment of principal together with a sum for interest on his purchase money. The question of the rate of interest to be allowed makes a vast difference with a calculation of what that purchase price should be. For instance, suppose a mine can pay $1,000,000 a year for 30 years, and then cease. If the purchaser demands 5 per cent on his money he can pay $14,740,000. If he demands 7 per cent he would pay only $11,380,000. At 10 per cent he will pay only $8,490,000. In terms of stock valuation such a property would be worth: At 5 per cent, $100 a share, at 7 per cent, $76.50 a share, at 10 per cent, $57.60 a share. Thus, a higher rate of interest means a lower estimate.

Copper for Automobiles

Although it is recognized that the development of the automobile industry has called for increasing amounts of copper, the extent of the consumption of this red metal on this account is not generally appreciated. Detroit is doubtless the leading city in the manufacture of motor cars, and no small amount of copper is shipped direct from the peninsula of Michigan to the City of the Straits. J. J. Hayes, manager of Gay & Sturgis, Detroit, furnishes some interesting data showing the amount of copper in each car of several well-known makers. He says: "There are 47 pounds of copper in every small Ford car; 100 pounds in every Cadillac, and 90 pounds in every Packard, to say nothing of all the other cars manufactured in Detroit. This year the Ford output will be 200,000 cars. That means a total of over 9,000,000 pounds of copper used by this single automobile manufacturing plant. Nine million pounds of copper is the total yearly output of some of our mines. It is half the yearly output of the Osceola Consolidated mine alone, and the Ford is only one of 40 automobile manufacturing companies that use an average of better than 50 pounds to every car that is built. This automobile data alone will tend to show where all the additional copper has gone, and where a lot more of it is going in the future."

The Myriawatt

A new universal unit for the measurement of power has been endorsed by a committee of the American Institute of Electrical Engineers and a committee of the American Society of Mechanical Engineers. This unit is known as the myriawatt and is intended to supersede the boiler horsepower unit heretofore employed. The ordinary value given to boiler horsepower very nearly corresponds to the value of the myriawatt, the former being equivalent to 33,479 B. T. U.'s per hour and the latter, 34,150 B. T. U.'s. The need of such a unit has become more acute with the rapid development of turbine generators, as considerable confusion has resulted in expressing the capacity of such outfits, there being no mechanical or electrical unit by which ratings could be made satisfactorily.

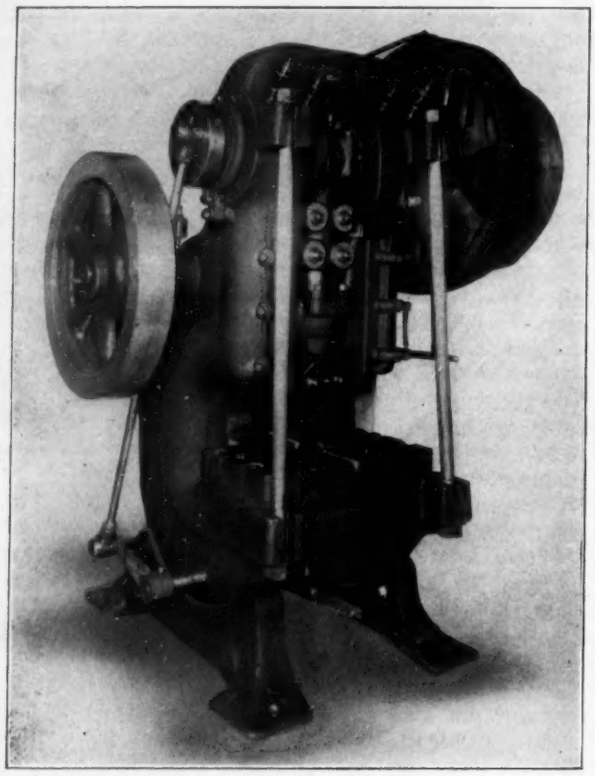


FIG. 1—BALANCE WHEEL SIDE OF POWER PRESS

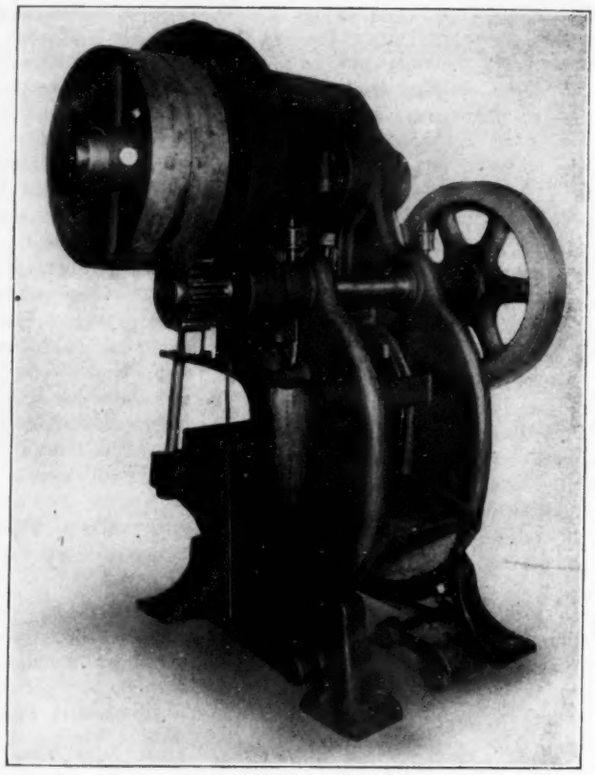


FIG. 2—BACK-GEARED DRIVE OF POWER PRESS

Back Geared Power Press

A back-geared power press having the novel feature of adaptation for use either as a direct-driven or a back gear-driven machine is shown in the accompanying illustration. Fig. 1 shows the adjustable knock-out which is actuated by an eccentric rod connected with a disc on the end of the crankshaft. This forces out swaged material from below and may be adjusted as desired. There is also a second knockout on the ram of the press. This operates through the slotted hole in the rear of the ram. In Fig. 2 the pinion at the left is shown in the position which it occupies when the machine is operating as a direct belt-driven press. Draw rods are inserted in holes on the pinion to draw it out, the gear guard being bored out somewhat larger than the outside diameter of the pinion. An adjustable collar keeps the pinion in position when it is set for driving on the back gears.

This machine is designed for use where a quick blow is required in blanking, swaging, or forming. It is fitted with a large friction clutch and the driving gear is made of gun metal and is 42 inches in diameter.

When used for swaging and forming, the machine is ordinarily provided with heavy tie rods which are removed when large sheets are blanked. These rods extend from the upper bearings obliquely downward to the outside of the bed. The machine is fitted with a leather-lined brake on the crank shaft.

This press has a 2-inch stroke, a gear ratio of 4 4/10 to 1, a normal speed of 90 revolutions per minute, is 16 inches between uprights, 8 feet, 6 inches in height overall, occupies a floor space of 6 feet x 5 feet, 6 inches, and weighs complete 14,800 pounds.

ELECTRIC DRUM CONTROLLER

A New Electric Drum Controller

The accompanying illustration shows an enclosed type drum controller equipped with a bevel gear entrained with a segment of another bevel gear, to which is attached the operating handle. By this means, the ordinary enclosed type, direct or alternating current, drum controllers may be arranged for operation by a forward or backward movement of the handle in a vertical plane instead of the ordinary semi-circular movement in a horizontal plane.

This device, as shown in the accompanying illustration, is manufactured by the Cutler-Hammer Mfg. Co., Milwaukee, and in respect to the drum, arc deflectors, cylinders, etc., is standard with the controllers previously manufactured by this company. If desired, this controller can be arranged for rope operation.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has perfected an insulating material which is known by the trade name "Micarta" and which is composed of layers of special temperature resisting paper bonded together and saturated with special material. "Micarta" is tan-colored and is said to be a hard, homogeneous material with mechanical strength 50 per cent greater than hard fiber. It can be sawed, milled, turned or machined as desired.

Commercial Production of Sound Steel Ingots

Description of a New Process Which Does Not Increase the Cost of Manufacture, Reduces Piping and Lifts Segregation

By Emil Gathmann

In some of the American steel mills, where it is essential to obtain sound billets or blooms, it is the practice to discard from 35 to 40 per cent of the crop or pipe end, and even with this excessive discard, secondary pipe or shrinkage cavities are frequently discovered during subsequent working of the blooms and billets into their various manufactured products. The usual discard of from 10 to 20 per cent from the crop end of the ingot, which is made by the present, generally-employed methods of solidifying the castings, certainly does not give the slightest assurance of the salable product being physically sound or chemical homogeneous.

Physically sound steel, as I would classify it, must be free from blow-holes as well as pipe. The line of demarcation between harmless and harmful blow-holes is exceedingly difficult to define. It is certainly the better and safer practice to eliminate blow-holes from the salable portion of the ingots and to form a well-defined shrinkage cavity or pipe at the upper crop end of ingot. The higher grades of steel are all piping steels.

Steel free of blow-holes—degasified—pipes to an excessive degree as it contracts from the liquid to the solid, and segregates along the vertical central axis of the ingot unless some method is employed to check this action; hence in the ordinary practice an excessive discard is necessary from crop end of the ingot to obtain sound, salable steel.

It has been my experience that the freezing or solidifying of an ingot which has been practically deoxidized or, as the term is used, *killed* in the mold, depends entirely upon the shape of the horizontal, cross-section of the ingot at its various planes from top to bottom, and also upon the thickness and consequent heat-absorptive power of various parts of the mold walls. This will be best understood by referring to the group of two ingots, each of same actual volume and weight, cast of crucible steel from the same heat and ladle. The ingot at the left, which was cast by my method and was split longitudinally, contains a vertical pipe of only about 10 per cent of the mass. The other ingot, not cast in this way, is shown at the right. The oxidized pipe extends about 33 per cent of the vertical height and volume.

Specifically, the new method employs a metallic mold constructed to accelerate the cooling of the lower or greater portion of the molten mass and teemed ingot (approximately from 80 to 85 per cent) and retards the cooling of the uppermost portion of the ingot, thus causing the upper portion to remain liquid longer and to act as a feeder. The upper portion of the ingot does not actually remain liquid much longer than in the usual practice for similar cross-sectional area, but as the cooling of the lower portion is greatly hastened, a differential in cooling is obtained, which is really what is to be desired. Similar results have been obtained by employing fire brick, or heating of the upper part of the ingot by coke, charcoal, etc.; but these methods usually offset any saving in a reduction of the crop ends, by their cost and delay in application.

According to my methods, it is essential that there be considerable lag in the cooling of the upper portion of the ingot, compared with the time of freezing of the lower portion, hence, the distance from the vertical central axis of ingot is made much less at the bottom of ingot and progressively increases towards the top of the ingot. In crucible-steel ingots, which are largely made in split molds, the actual sectional area of the top and bottom may remain practically constant throughout the length of the ingot, but the distance from

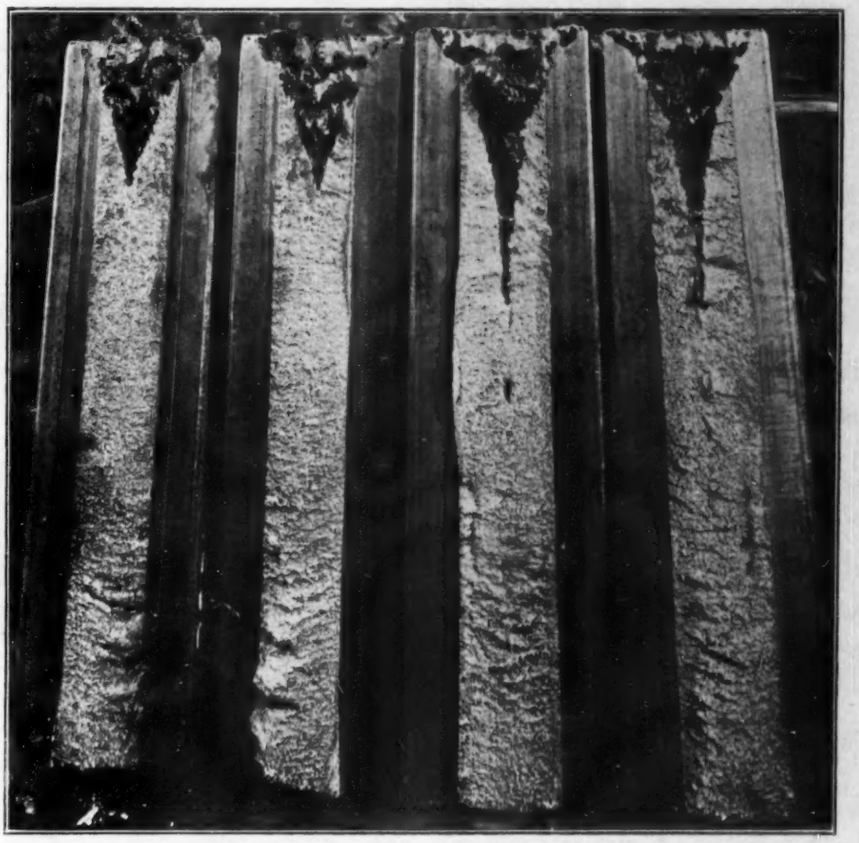


FIG. 1—SPLIT INGOT CAST BY THE GATHMANN PROCESS AT THE LEFT; ORDINARY INGOT AT THE RIGHT, SHOWING PIPING

[1]From a paper presented at the annual meeting of the American Institute of Mining Engineers.

the vertical longitudinal axis to the surface of the ingot progressively increases towards the top. In ordinary big-end-up practice, where sufficient taper or differential in distance from the vertical axis to the surface of the ingot is given, to accomplish any notable reduction in depth of piping, the actual cross-sectional area of the lower part of the ingot is much less than that at the upper part, hence the depth of pipe is not the true index of the actual volume or weight of cropping necessary to obtain physically sound steel.

One of the advantages of my system or type of ingot is that it is possible to obtain a practically uniform cross-sectional area at top and bottom of ingot and still obtain the benefits of the big-end-up type of mold.

Lifting of segregation is generally conceded to follow the reduction of pipe, and where the pipe is lifted the steel below undoubtedly becomes more homogeneous and freer from segregation.

For open-hearth practice with the big-end-up ingot, one of the greatest difficulties has been to devise a method of stripping and handling the ingots. I have worked out a method which will accomplish this result and not interfere with the prevailing administrative practice or reduce the tonnage production.

Fig. 2 shows the Gathmann ingot mold and stool on a car or buggy after teeming. The big-end-up mold will require a special type of stool to avoid such difficulties as might ordinarily be experienced in stripping, due to fins forming at the base of ingot and locking it to the mold. A downwardly tapered plug, *C*, Fig. 3, seals the base of the mold and projects through the stool, *P*. When the teeming is finished the metal, by reason of the wedge-like taper at the lower portion of the ingot, is forced into virtual contact with the walls of the mold, which, due to the thickness of same, rapidly absorb the heat of the ingot. A slight differential or reverse taper of the cavity is made from 15 to 20 per cent from the top of the mold. The ingot in shrinking will automatically provide an air space at this portion, thus breaking the contact of ingot from mold walls and retarding the flow or loss of heat from this portion of ingot.

Fig. 5 shows in elevation, a modification of Gathmann mold without the stool. This type is used for bottom-cast ingots and ingots cast in pit work. A special form of stool is required. Fig. 3 shows a stripper of well-known construction, with some details changed to suit the stripping of the big-end-up mold. The usual plunger is provided with a yoke whereby the lifting-lugs on the mold may be engaged. The plunger may then be raised or lowered, thus raising or lowering the mold, and in case of the ingot sticking in the mold upon lowering, the yoke is forced downwards on the mold which rests on the combined sealing and stripping plug, *C*; the ingot is thus projected above the upper part of the mold, or rather the mold is lowered down, exposing the upper part of ingot. If a *sticker* is encountered, the weight of the thrust from the yoke on the upper portion of mold is taken up by the hanging arms, *R*, which engage the lugs, *X*, on the stool, *P*. The usual soaking pit crane is employed to remove the ingot entirely after it is exposed above the mold walls, the cars carrying the ingot contained in the mold being run into the proper position for this operation.

Fig. 4 shows a slab ingot mold

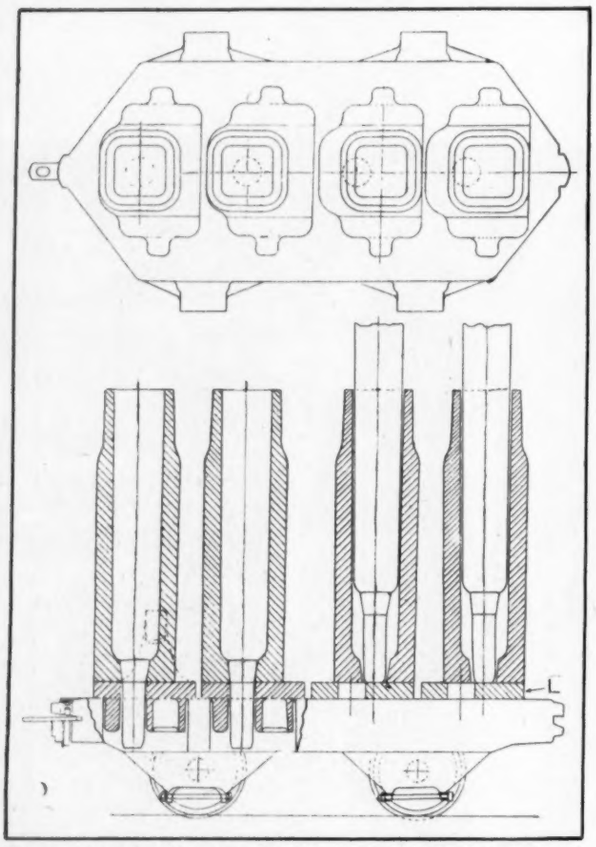


FIG. 2—PLAN AND SECTIONAL VIEW OF GATHMANN INGOT MOLD AND STOOL ON A CAR AFTER TEEMING

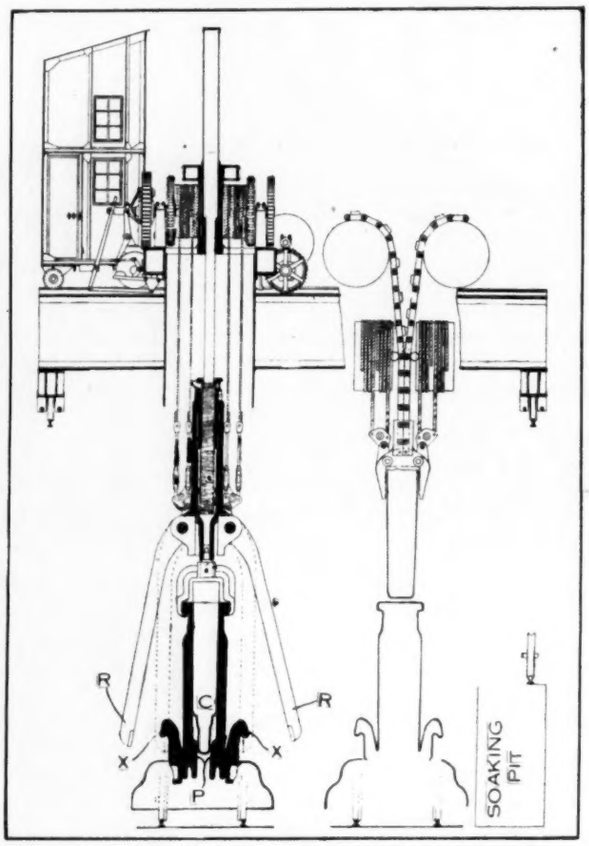


FIG. 3—STRIPPER WITH SOME DETAILS CHANGED TO PERMIT OF STRIPPING BIG-END-UP MOLDS

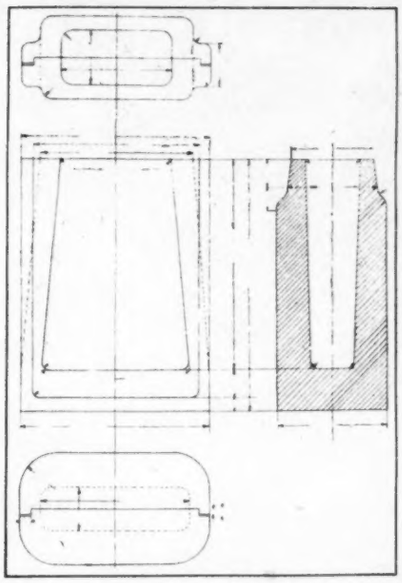


FIG. 4—SLAB INGOT MOLD DESIGNED FOR PLATE OR SHEET MILLS ROLLING DIRECT FROM INGOT

designed for plate or sheet mills desiring to roll directly from the ingots. This ingot is made similar to the crucible steel ingots, with uniform cross-area at top and bottom so as to obtain equal width from finished plates or sheets. The ingot may be designed of approximately the following general dimensions: 20 x 10 inches at the upper portion and 26 x 7 inches at the lower portion. The nearest distance from the vertical central axis of ingot to the surface would thus be 5 inches at the top of the ingot, and but 3.5 inches at the lower part, with approximate progressive dimensions intermediate. This ingot is cast in a similar design of mold as previously described, wherein the cooling is greatly accelerated by means of absorptive action of heavy mold walls. This mold is necessarily made in two parts and held together with clamps in order to allow ready stripping of ingot.

The general practice, as outlined in the foregoing brief description, reduces the pipe in the deoxidized or killed steel so that with an average discard of 12 per cent, sound metal will be obtained. Segregation undoubtedly will be disposed of in direct ratio to the lifting of the pipe. The stripping apparatus and bottom-sealing stool makes practicable the use of the big-end-up for car practice without complications in removing the ingot.

I desire to repeat that this system is not in an experimental stage, as many tons of steel are daily being cast in both open-hearth and crucible plants in accordance therewith.

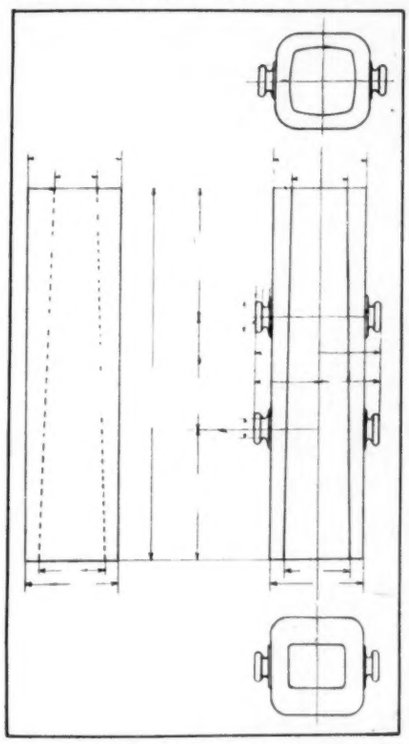


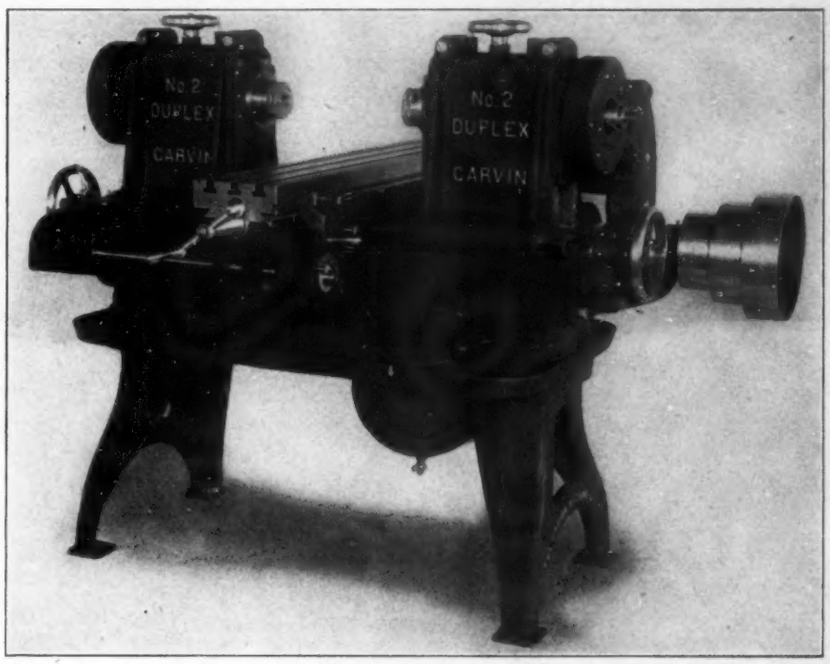
FIG. 5—MODIFICATION OF GATHMANN MOLD WITHOUT STOOL FOR BOTTOM CAST INGOTS

An investigation of the export business is said to have revealed the fact that American-made electrical transformers have been installed for most of the high voltage work in foreign countries. It is further claimed that the American-made transformers have gained the ascendency over their European competitors.

A Duplex Milling Machine

A new machine adapted to use on castings requiring the milling of two opposite faces, is being built by the Garvin Machine Co., New York.

The machine shown in the accompanying illustration is adapted for light work. It is unequaled for certain classes of work and makes possible an output nearly double that of the standard milling machine. It will be noted that the spindles have independent vertical adjustments controlled by micrometer hand wheels. By this means the cutters may be independently adjusted and it is possible to produce not alone flat work, but work requiring a bead or in which corners and ledges occur. As a result this machine has practically all of the advantages of the more common, single, milling machine.



DUPLEX MILLING MACHINE FOR LIGHT WORK

The driving shaft of the machine follows the bed at the rear and from it the spindles are driven by trains of gears. The cone pulley which is back-geared, 3 to 1, provides changes of speed on the driving shaft. The fed may be changed from 1/200 inch to ⅛ inch per revolution of the spindle. The table is 9½ inches wide, has three T-slots and is fitted with automatic trip and reverse.

All the gearing is guarded and an oil pump and reservoir, combined with extensions which catch the drip from the table, make ample provision for care of the lubricant. The weight of the machine is 2,465 pounds.

Solution of the Sound Steel Ingot Problem

New Processes for the Elimination of Piping and Segregation in Ingots Reported at the Annual Meeting of Mining Engineers

Can steel ingots, free from pipe, segregation and other defects, be produced successfully on a commercial basis, was answered in the affirmative at a joint meeting of steel manufacturers, railroad engineers and metallurgists, held in New York last week.

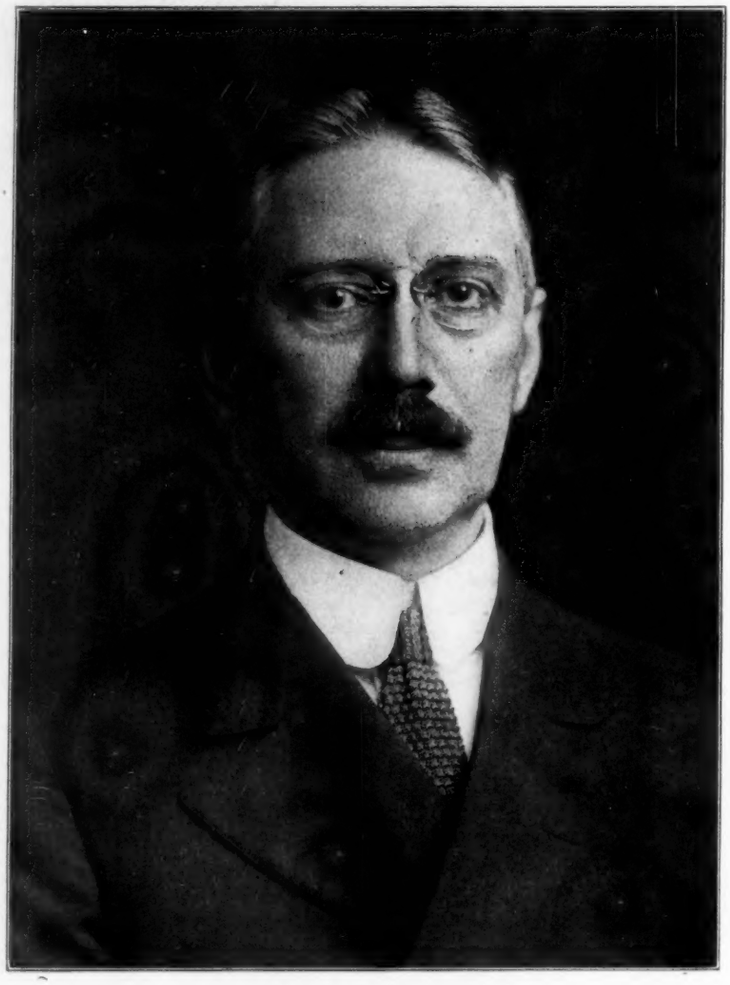
The solution of this problem, which is daily incurring heavy losses in American steel plants and has been a contributing factor of many railroad wrecks, ultimately will result in the elimination of physically defective rolled material, which today is traced to ingots insufficiently cropped.

The two processes, which have been developed in this country, have been applied only to crucible steel ingots, but with minor modification, larger ingots, such as are required for rails, and other heavy rolled sections, can be treated by these methods.

In striking contrast to the willingness of noted metallurgists, railroad inspecting engineers and other investigators of the sound steel ingot problem, to contribute freely to the discussion, was the attitude of the representatives of the leading steel producers who listened attentively, but politely refrained from throwing additional light upon the subject by reporting the results of experiments which they have made and the experiences they have had in the production of sound ingots.

Two new processes for the production of sound steel ingots, in successful commercial operation at a number of steel manufacturing plants in this country, were reported at the annual meeting of the American Institute of Mining Engineers, held at the Engineering Societies' building, New York City, Tuesday and Wednesday, Feb. 18 and 19. In England, the Hadfield and Talbot processes have been introduced and large tonnages of steel have been made by these methods, the product being sound and free from such defects as piping, segregation, blow-holes and diffused solid, non-metallic impurities. Unfortunately, the two new American processes have been applied only to the production of ingots in crucible steel plants. These, of course, are much smaller than the ingots from which rails and other heavy sections are rolled, nevertheless the same conditions prevail and the same degree of success is predicted for the larger ingots, as already has been obtained with smaller masses of steel.

The Gathmann process, devised by Emil Gathmann, of Baltimore, involves casting the ingots large end up and for removing large ingots from the molds, a modified form of ingot stripper will have to be employed. In casting small ingots of crucible steel this difficulty was obviated by the employment of a two-part mold. The mold is designed to accelerate the cooling of the lower portion of the mass of steel and to retard the cooling of the uppermost part of the ingot, causing this part to remain liquid an increased length of time, as compared with ordinary practice, and permitting the molten metal at the top to act as a feeder. The other process, devised by the Simonds Mfg. Co., Fitchburg, Mass., utilizes the compression principle. The ingot is compressed hydraulically while the interior is still molten and the pipe and segregation are eliminated entirely. Although comparatively small ingots, thus far have been treated in this way, equipment is being installed for the treatment of ingots weighing 2,000 pounds. Another method to eliminate piping was described by G. H. Clamer, of the Ajax Metal Co., Philadelphia. This provides for electrically heating the metal in the top of the ingot, and while the principle is similar to that of the Hadfield and several other processes, its method of application is exceedingly novel. The process is described in detail, elsewhere in this report. The session devoted to the discussion of the production of steel ingots without defects was unusually well-attended. Practical-



CHARLES FREDERICK RAND,
President of the American Institute of Mining Engineers

ly all of the leading steel manufacturers were represented and many of the inspection engineers of the leading trunk lines and the most noted American metallurgists, also were present. It was unfortunate that none of the representatives of the large steel producers took part in the discussion, although called upon individually to contribute their experiences.

The problem involving the production of sound steel ingots was discussed under the following subdivisions:

Is the present method of getting rid of the pipe by cropping a safe and reliable device for making sound steel?

Is it desirable to increase the amount of metal arbitrarily cropped off the top of an ingot and, if so, what would be a fair excess price for cropping off 20 per cent?

Is it commercially practicable to make ingots without pipes or blow-holes and what additional expense of manufacture would be justified to accomplish this result?

What process for making pipeless ingots seems the most promising for commercial success, and why?

A symposium of papers on various phases of this subject preceded the discussion. These included the following: "Pipe and Segregation of Steel Ingots and Ductility Tests for Open-Hearth Steel Rails", by P. H. Dudley; "The Production of Solid Steel Ingots", by Benjamin Talbot; "Comparative Notes on Steel Rail Rolling", by Robert W. Hunt, and "The Commercial Production of Solid Steel Ingots", by Emil Gathmann.

P. H. Dudley, consulting engineer, New York, stated that the greater the degree of deoxidation of rail steel, the greater will be the difference between the inclosed volume of hot fluid metal in the mold and the cooler will be the resulting set metal. Exterior blow-holes in the outside walls of ingots can be prevented from forming by sufficient deoxidizers, such as silicon, ferro-titanium or their combination, and aluminum. He added that the latter has been used exclusively, but all of its oxidation products do not always escape from the metal and it should not be used when the steel is to be subjected to the present heavy wheel loads. It was customary a few years ago to teem ingots which were only 18 x 20 inches square, from which four lengths of 100-pound, 33-foot rails were rolled. The height of the ingot compared to the base was so great that before any shrinkage occurred in the vertical, hot ingot walls, the interior shrinkage cavities developed and this could not be prevented from forming entirely even by properly charging the ingots in the reheating furnaces to equalize the heat for rolling. Rails rolled from these ingots developed many split heads and some true pipes, the product from two to three mills being quite pronounced in this respect. Subsequently, the New York Central lines specified short, stubby ingots from 2½ to 3 times the length of the width of the base. Ingots weighing 8,200 pounds, teemed into molds, 20 x 24 inches, have been made extensively for six lengths of 33-foot, 100-pound rails with practically complete elimination of piped rail sections. The blooms, however, are cut and are rolled into three-rail lengths at a time. Ingots, 25 x 30 inches, weighing about 12,000 pounds, have been used for 8, 33-foot basic open-hearth, 100-pound rails, where the ordinary rail mill equipment had not been installed. The large mass of metal in a short ingot, Mr. Dudley said, does not cool quickly and from the teeming of from 60 to 80-ton melts, the ingots are charged into the reheating furnaces in one hour and 30 minutes and before all the interior metal has set, when but a trace of shrinkage cavity had developed.

Charles Frederick Rand

With an experience of more than a quarter of a century in the development, operation and management of iron ore properties, both in the Lake Superior district and in Cuba, Charles F. Rand brings to the office of president of the American Institute of Mining Engineers, to which he was elected last week, a wide knowledge of the mining industry, both in the United States and foreign countries.

Mr. Rand was born in Canaan, Me., Aug. 17, 1856. From 1876 to 1886 he was financial officer of a railroad corporation at Milwaukee, and for several years thereafter he was president and treasurer of a number of mining companies operating on the Gogebic range, including the Aurora, Colby, Tilden, Palms, Superior, Iron Belt and others. He also was receiver of the Penokee & Gogebic Consolidated Mines and reorganized that company.

During the last 17 years, Mr. Rand has been engaged in the development of iron ore properties in Cuba and is now president of the Spanish-American Iron Co., the Ponupo Manganese Co. and other companies operating in Cuba. He was the discoverer of the great iron ore deposits on the northeast coast of Cuba and appreciated their value as a source of supply for the blast furnaces located on or near the eastern coast of the United States.

Ductility tests for rail steel which were introduced by the New York Central lines several years ago, were explained at length and in conclusion, Mr. Dudley pointed out the following conditions which should be met to insure the production of sound steel for rails:

1.—The chemical composition should provide for sound steel of ample physical properties of tenacity and toughness rather than hardness combined with brittleness.

2.—The impurities, phosphorus and sulphur, should be of minor content so the bath of metal can be purified to produce the large percentage of toughness and ductility due to the specified chemical composition.

3.—The ingot should have such relations of area of base compared to the height and weight that under good mill practice and suitable deoxidizers, it can be made with controlled segregation, and only a trace of a shrinkage cavity in the top; then, when bloomed under its equalized initial heat, it is rendered pipeless by the usual 8 to 10 per cent discard.

4.—Aluminum can be replaced and silicon partly, as deoxidizers, with advantage by the use of ferro-titanium to purify, solidify, and check segregation in rail, tire, and axle steels, and also some of the lower grades of carbon steels where great purity is desired.

5.—The ductility and elongation tests, to date, furnish the best and only prompt means of determining the degree of purification of the steel per melt as it is made by indicating the physical properties secured before another melt is tapped from the same furnace, and are of decided advantage to the manufacturer as well as to the consumer. These tests are so advanced that they must be applied with knowledge and understanding for proper results, and not made mechanically for specified records.

6.—Every process or step of the entire manufacture of the steel, rolling and finishing of the rails, must contribute its part to secure the highest quality of the product incident to the chemical composition.

7.—Specifications should be drawn to indicate some of the major necessities of the consumer, and the tests and inspection conducted in a spirit to aid and invite the co-operation of the manufacturers to meet the progressive requirements in rail steel.

The Use of Thermit

Dr. E. A. Beck, of the Goldschmidt Thermit Co., New York, detailed experiments which have been made with thermit to eliminate piping in ingots. The can of thermit is introduced as far as possible into the ingot so that the reaction practically is started at the bottom of the mass of metal and the stirring reaction by which segregation, blow-holes and pipes are reduced, proceeds from the bottom to the top. At one plant in Germany, 17,891 ingots, weighing 35,902 tons, have been treated with anti-piping thermit with a considerable improvement in the steel, particularly with reference to the elimination of pipes. In top-pouring, the thermit cans are introduced when the crust on the steel extends over about one-half of the ingot. For treating an ingot weighing approximately five tons, seven minutes should elapse from the time of pouring for the cooling to proceed to the proper point for the introduction of the thermit can. In small ingots, the treatment increases the cost in open-hearth steel works about 35 cents per ton and against this there is an estimated saving of about 75 cents per ton in the rolling department. Ingots weighing eight tons and more can be treated at a cost of only 20 cents a ton.

The Gathmann process, described elsewhere in this issue, was outlined by

Emil Gathmann, of Baltimore. He stated that it was his experience that the freezing or solidifying of an ingot that has been practically deoxidized or killed in the mold, depends entirely upon the shape of the horizontal cross-section of the ingot at its various planes from top to bottom and also upon the thickness and consequent heat-absorptive power of various parts of the mold walls. Mr. Gathmann's process is commercially successful and the average discard has been reduced to 12 per cent. The segregation, he estimates, is disposed of in direct ratio to the lifting of the pipe and big-end-up ingots are employed.

In the absence of Benjamin Talbot, his process, previously described in these columns, was outlined by Chas. Kirchoff and the Hadfield process in the absence of Sir Robt. Hadfield, was outlined briefly by Henry D. Hibbard. This process consists of maintaining the top of the ingot in a molten condition by the use of a layer of slag upon which charcoal is placed, a diffused blast being applied to the charcoal. This process likewise is commercially successful and is used quite extensively in England.

Discussion

Prof. Albert Sauveur, of Boston, the noted metallographist, was called upon to open the discussion in view of the fact that he was one of the pioneers to point out that defects in rails could be directly traced back to the ingot. He said that the subject was one of the most important, significant and far-reaching that has ever been discussed by the Institute of Mining Engineers and that steel makers all over the world would look forward to the results of this meeting with a great deal of interest. Approximately 20 years ago, Prof. Sauveur stated that he saw ingots in rail mills piped one-third of their length, which were rolled subsequently into rails with a discard of only 10 per cent. At that time, he pointed out that it was his belief that defective rails were caused by these pipes and subsequent investigations have confirmed his theory. He added that he felt gratified that both manufacturers and users are now willing to meet on common ground to discuss the problem. In conclusion, he said: "When we realize that human life is at stake, we cannot approach this subject with too much seriousness and earnestness."

Robt. Job, of the Milton Hersey Co., Montreal, in reply to the first question relative to the present method of getting rid of the pipe by cropping, stated that good mill practice, to a large extent, will prevent piping, whereas in poor mill practice, a discard of 50 per cent would not get rid of the unsound steel in the ingots. Replying to the second question, relating to a fair excess price for cropping off 20 per cent of the ingot, he again stated that with good mill practice, little or no piping will occur in steel ingots and if the amount of its discard is left to the mills to control, otherwise good mill practice will be penalized. Mr. Job added that to detect piping and other injurious defects in rail steel, it is the practice of the Lehigh Valley railroad inspectors to number the ingots and to test the top butt of each ingot under the drop. If this fails, three or four rails rolled from that ingot are rejected. This procedure in no way interferes with mill operations and has proved very satisfactory. Replying to the third question relative to the commercial practicability of producing ingots without pipe or blow-holes, Mr. Job said that it is practicable to make rail steel free from blow-holes and other defects. However, he pointed out that too much attention cannot be paid to the proper deoxidation of the metal and he ventured the opinion that every engineer and every mill operator welcomes the work that has been done in the discovery and development of deoxidizers for steel. Referring to the ductility test devised by P. H. Dudley, he said that it has been adopted widely and has proved its efficiency.

Max A. Wickhorst, engineer of tests of the American Railway Engineering Association, divided the great bulk of rail failures into three groups, namely, head failures, which consist largely of split heads; base failures, which include the moon-shaped breaks and rails broken through their cross-section, frequently termed straight or angular breaks. The head failures can be traced directly to the ingot from which the rails were made and, roughly estimated, these include one-half of the failures reported. These head breaks indicate the segregation of the metalloids in the steel and etching usually shows a spongy condition, which can be traced back to the interior condition of the ingot. These breaks also are confined almost entirely to rails from the upper third of the ingot. Mr. Wickhorst added that segregation must be distinguished from piping and that this can be produced by the employment of such deoxidizers as silicon, titanium and aluminum. When these are used, the ingot usually develops a deep pipe, but the spongy condition of the steel is eliminated as well as most of the segregation. If piping and segregation of the steel could be eliminated, it was his opinion that at least 50 per cent of the rail troubles could be obviated.

Compression Process

L. E. Howard, of the Simonds Mfg. Co., Fitchburg, Mass., displayed two ingots cut longitudinally, which were of small size, as customarily used in crucible steel works. The one ingot which had been treated by a new process developed by this company, showed an almost entire absence of pipe, whereas the other ingot, not so treated, had a pipe extending practically one-third its length. The ingots are cast in split molds and almost immediately after pouring, the ingots are stripped and are compressed in a powerful hydraulic press. The interior of these ingots is in so fluid a condition that if the ingots are handled roughly, they are liable to burst open. The success of the process depends almost entirely upon the compression of the ingots while the interior is still fluid. The first tests were made with 15-pound ingots and subsequently 100-pound and 600-pound ingots were cast and treated in this way. At the present time, molds and apparatus are being designed for 2,000-pound ingots. Experiments also are being conducted in the employment of solid molds and the same satisfactory results have been obtained. The process is commercially successful and its cost, including interest on investment, operation, etc., is only 3 per cent of the value of the ingots.

Views of Public Service Engineer

J. E. Sague, engineer of the New York state public service commission, said that he had had many conferences with railroad operators and steel manufacturers to ascertain the limitations of rail manufacture. He added that failures of rails are very much exaggerated from the broken rail standpoint, yet they are sufficiently grave to incite investigation. It was not his endeavor to conduct this investigation for the purpose of arriving at a conclusion as to how rails should be made, but he tried to learn to what extent the mills and railroads were accountable. Interviews with railroad operators and locomotive builders indicated clearly that a condition of extreme severity has arrived in the use of steel rails, wheel weights having increased tremendously and at the same time the hardness of the rails has been increased to improve wearing qualities. It was his opinion that the railroads probably would have to use softer rails, but it may be possible that some increase in wheel weights will be permissible as the result of track improvements, including deeper ballast, etc., which are being made by most of the roads. His investigation showed that rail breakages largely can be traced to the speed of trains and that a reduction of the speed of fast passenger trains will aid tremendously in solving the rail breakage problem. In reducing the speed of several fast trains, the railroads have done the public a great service and in conclusion, Mr. Sague said that the

public needs a uniform schedule of trains operating on time rather than a few trains on fast schedules.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., called attention to the fact that the forces that lead to the production of pipe are continuous and for this reason the cure must be continuous. In view of the fact that the Hadfield and Talbot processes eliminate segregation, the problem seems to appear in a new light. The drillings for commercial analyses taken from various sections of the ingot, do not always reflect the amount of segregation that may be present in various parts of the ingot. By cooling the metal slowly, the pipe might be obliterated. However, Mr. Hibbard stated that the difference in temperature between the top and bottom of the ingot must be preserved and that this can be effected by the application of heat at the top of the ingot.

Laminated Streaks

James E. Howard, of the Watervliet arsenal and engineer-physicist of the United States bureau of standards, said that blow-holes and pipes are the first to disappear from an ingot. An examination of the steel in the early passes, he said, indicates, at times, the almost entire elimination of the effect of these defects. He pointed out that two-thirds of an ingot structurally sound, contains slag globules which are extended during the rollings and which will not weld. This state of unsoundness, he believes, leads to broken rails. The laminated streaks which are so prevalent in rail fractures, indicate unsoundness of the steel caused by minute slag inclusions in the upper part of the ingots.

Standard Discard

W. C. Cushing, chief engineer maintenance of way, of the Pennsylvania southwest system, directed attention to a statement made by Dr. Puppe, of Germany, at the 1912 meeting of the Iron and Steel Institute to the effect that in German practice, piping is eliminated almost entirely and that if the amount of discard is to regulate the price, then a premium is offered to the mills that will not improve their processes. Mr. Cushing added that the worst feature of the adoption of a standard amount of discard is the fact that it will not remove all of the defective steel from the ingots made at some of the mills. Statements also were made at the meeting of the Iron and Steel Institute to the effect that rail breakages were unusually heavy in this country and the speaker called attention to the fact that the European engineers do not differentiate between breakages and defects of the head, web and base. The actual broken rails only amount to from 20 to 25 per cent of the total of rail defects reported, whereas base defects amount to from 5 to 10 per cent, web 5 per cent and head defects predominate, averaging from 60 to 70 per cent. Mr. Cushing called attention to the varying opinions expressed by several of the speakers and authors relative to the use of deoxidizers and he asked for further information on this subject.

Electric Process

Another method of eliminating pipes and segregation was described by G. H. Clamer, of the Ajax Metal Co., Philadelphia. The process involves keeping the top of the ingot molten by the employment of the principle upon which the Hering electric furnace is operated, namely, the production of heat in a body of liquid metal, the dimensions of which are so restricted that a current of high current density forces through it, producing the pinch effect. This automatically expels the metal from the center of this restricted body of metal, causing it to flow in gradually around the periphery of the ejected core of the liquid. The device practically is a furnace or heater of the resistance type, using liquid as the resistor. The pinch effect principle of operation is being incorporated in four electric furnaces for refining steel, which range in capacity from one to three tons. The device for heating the ingot tops, consists of a transformer, direct-connected to metallic electrodes and a block of magnesite in which the resistor holes are placed. It has been concluded that transformers with capacities of from 10 to 50 kilowatts would take care of practically all commercial sizes of ingots. The current is transformed from 110, 220 or 440 volts to 4 to 6 volts, with a corresponding increase in the amperage.

Dr. Allerton S. Cushman said that the special metal manufactured by his clients, which is almost a pure iron, pipes very little, although a large ingot splitting saw is being installed to facilitate the investigation of this subject. Furthermore, as the material is used largely for sheets and bars, the piping feature is not of great importance.

Deoxidizers Compared

M. Petinot, of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., discussed the use of aluminum, silicon and titanium as deoxidizers. He said that aluminum is the most powerful of all of the deoxidizers known, as it will reduce the oxide of both silicon and titanium. However, this oxidation produces alumina, which melts at 2,010 degrees Cent., and consequently is infusible at the temperature of the bath. This alumina will remain in the steel and if any part of it is near the top of the ingot, it will cover the surface of the pipe and shrinkage cavity, and immediate rolling, as suggested by Mr. Talbot, will not eliminate this impurity. When streaks of alumina are present between the metallic crystals of a steel rail, they destroy the continuity of the metal and, having no strength in themselves, they are readily broken and cracks started in this way will spread through the adjacent metal.

With reference to silicon, Mr. Petinot said that it is not as powerful a deoxidizer as aluminum and that its use leaves a portion of it in the steel, but unfortunately the usual determinations of silicon give no clue to its state as to whether it is in the form of a silicide, silicic acid or a silicate. He added that microscopic examination of rails frequently shows the presence of small shots of foreign matter. These consist frequently of sulphide of manganese and also of oxides and slag. Frequently, a steel containing 0.10 per cent silicon, as iron silicide, will pour wild, necessitating the addition of aluminum to the steel.

Use of Titanium

Titanium, Mr. Petinot stated, when added to steel in the ladle after the silicon addition has been made, will complete the deoxidation. He claimed that it is the only deoxidizer which can be used without danger of leaving its oxidation products in the steel. Titanium, by oxidation, gives titanic acid, which fluxes the slag in suspension in the steel. If the reaction is allowed sufficient time, the titanium will rise completely to the top of the steel, insuring sound material. Silicon, the speaker believed, should be used moderately and the deoxidation should be completed by titanium, thereby obtaining a reaction on the oxides, insuring the fluxing of the slags and a reduction of the iron silicates formed in the steel by the introduction of the ferro-silicon. The speaker said that good steel always pipes and he has found that silicon and titanium are antagonistic.

Welding Blow-Holes

Dr. Henry M. Howe called attention to the fact that when welding blow-holes in steel ingots, the solid non-metallic impurities are squeezed into the blow-holes and this seems to be a serious objection against closing the pipe. He agreed with the previous speakers that good steel usually contains a pipe, but he was of the opinion that the pipe can be further reduced by careful mill operations. To accomplish this, he suggested that the ingots be cast from the top, with the large end up, thereby having a larger mass of molten metal at the top of the ingot. All of the processes which provide for the application of heat to the top of the ingot, merely

retard solidification. He suggested, also, that it might be advisable to taper the mold so that its sides at the bottom would be exceedingly thick and proportionately thin at the top. This would retard solidification at the top and would hasten it at the bottom.

K. W. Zimmerschied, metallurgical engineer of the General Motors Co., Detroit, discussed the effect of piped steel and other defects in the automobile industry. He ventured the opinion that 50 per cent of the difficulties arising from defective steel can be traced to the ingots. These are due to pipes, segregation and non-metallic impurities in the steel. However, the difficulties that can be traced to piping are not as great as those which arise from segregated material, and the difficulties arising from the inclusion of non-metallic impurities, also are small. He expressed the opinion that the present method of getting rid of the pipe by cropping, is adequate, provided the inspection can be made on cooled billets. Pipes and defects due to segregation usually can be detected in this way. It also has been ascertained that all blooms which are piped give billets that show indications of this defect. Increasing the amount of discard with a proportionate increase in price, the speaker said was out of the question. Referring to segregation, he said that the segregate is in the form of crystals and when rolled down causes laminated streaks inside of the bar. The speaker believed that it is commercially possible to make ingots without pipes or blowholes and that the additional cost is largely a matter for commercial consideration. Referring to the processes that seem most promising for making sound steel, he added that the cure must be continuous. In conclusion, he suggested that although it might appear foolish, nevertheless, it might be possible to split every ingot, thereby having the pipe on the outside of the steel.

Henry Hess, of Philadelphia, detailing experiments which he had made to ascertain the underlying causes of piping in ingots, said he employed rosin which was cast in small test tubes. He was able to make a pipe in the tube at any point and also of any size. He found that the work done in heating the top of the rosin to eliminate piping, promised to be the most successful and then experimented along this line for the production of a sound steel ingot. Unfortunately, the steel did not act like the rosin and after the ingot was machined, a large pipe developed.

Capt. Robert W. Hunt, of R. W. Hunt & Co., in a paper entitled "Comparative Notes on Steel Rail Rolling," pointed out the importance of the mechanical and heat treatment of the metal for rails. During the past year, an order for open-hearth steel rails was divided between two plants of one corporation, one mill having received a rolling order for 18,000 tons and the other for 7,500 tons. The rails were of the same section and were to be made under the same specifications. The rolling results obtained in the two mills varied widely. This, Capt. Hunt stated, illustrated the advantages of careful ingot casting, and quite as pertinently, the possible benefits of careful subsequent heating and rolling, with moderate reductions in the rolling process. The smaller order was rolled complete in four installments, during the same months that the larger order was made, but in eight separate installments. To permit of exact comparisons, the totals of the four installments completing the order at the one mill, which will be designated as *A*, are given in the accompanying tables with the totals of the first four installments of the larger order made by the mill which will be referred to as *B*.

Table I.

ROLLING RESULTS OF THE TWO MILLS.

	Mill A.	Mill B.
Number of rollings	4	4
Total number of rails rolled	18,278	27,832
Percentage of rails cut to short length because of flaws near ends.	0.7	7.6
Percentage of rails made second quality for flaws, etc.	0.9	6.3
Percentage of rails scrapped for flaws, etc.	0.6	4.5
Percentage of rails scrapped for failure at drop test	none	3.4

Table II.

COMPARISON OF CHEMICAL COMPOSITION AND DROP TEST SPECIFIED AND AVERAGE RESULTS OBTAINED.

	Specified. Per cent.	Average obtained. Mill A. Per cent.	Mill B. Per cent.
Carbon	0.55 —0.70	0.60	0.61
Phosphorus	Not over 0.045	0.023	0.023
Manganese	0.65 —0.95	0.83	0.74
Silicon	0.075—0.18	0.13	0.14
Sulphur	Not over 0.055	0.029	0.039

PHYSICAL TESTS.

	Min.	Max.	Min.	Max.	Min.	Max.
Deflection on 4-foot supports with 2,000-pound tup falling 20 feet (inches)	1.75	3.25	2.3	3.2	2.2	3.8
Average deflection (inches)	....	....	2.7	...	2.8	...
Number of test pieces break'g on first blow	....	....	...	...	9	...
Number of test pieces, showing pipe or segregation when nicked and broken	....	....	3	...	9	...
Number of heats rejected because of 2 pieces failing at drop test	....	....	...	...	2	...
Number of heats rejected for exceeding deflection limits at drop test	....	....	...	...	4	...
Number of heats rolled	....	....	119	...	173	...

Table III.

CARBON RESULTS AT BOTH MILLS.

Permitted carbon, per cent.	No. of heats, mill A.	mill B.
0.55	..	20
0.56	1	8
0.57	2	9
0.58	4	14
0.59	5	12
0.60	17	16
0.61	17	14
0.62	14	14
0.63	13	14
0.64	14	15
0.65	11	7
0.66	8	7
0.67	9	10
0.68	4	6
0.69	..	6
0.70	..	1
Total heats	119	173

Rolling Results

The rolling results at both mills are contained in Table I. The figures indicate ordinary performance not influenced by unusual errors either of workmanship or mechanical troubles. Both mills worked to exactly the same specifications and produced a section which has been in use for several years. The rail is an 85-pound section, having 36.7 per cent of the metal in the head, 22.2 per cent in the web and 41.1 per cent in the base. The chemical composition and drop tests specified, with the average results obtained, are given in Table II. Both mills took advantage of the full range permitted in the chemical limits. Table III shows how successful the mills were in obtaining consistent carbon results and it will be noted that the results obtained at mill *A* were more consistent than those of mill *B*.

As the chemical composition ob-

tained at the two mills agree so closely, some other reason must be sought to explain the divergent physical results obtained in the product. Therefore, data on the actual performance of the melting operation are important and the principal items to be considered are included in Table IV. Both mills cast heats approximating 85 tons, which were made by almost identical methods, the iron having been taken from mixers. As far as possible, at both mills, the mixer metal was used for recarbonizing in the furnaces, but many heats had coal or coke added to the metal when tapped, in addition to the usual ferro-manganese and ferro-silicon. Capt. Hunt pointed out that it is pertinent to note that only six furnaces furnished the metal at mill *A*, as against 27 which furnished the metal at mill *B*. Consequently, there were probably only two steel melters working at plant *A*, as against at least six at plant *B*, and the personal equation may have played an important part in making the steel.

Heating and Temperature Variables

While the average of the time intervals for the various operations at the two mills do not vary widely, the range between the minimum and maximum for *B* are consistently greater than for *A*. Capt. Hunt stated that there is but little doubt that the difference between casting and stripping ingots and between stripping and charging them in the soaking pits is liable to be seriously reflected in the soundness of the ingots and of at least equal importance, is the necessity for teeming the steel at a uniform temperature. The variation of 50 minutes in the time that the heats were held in the ladle prior to casting must have caused variable teeming temperatures and produced many blow-holes in some of the ingots. Continuing, Capt. Hunt said: "Admitting the presence of blow-holes near the surface of the sides of the ingots and remembering the oxidizing action in the soaking pits, it is not surprising that heavy reductions in the blooming mill have an extremely detrimental effect on the product. This is reflected, no doubt, in the large number of rails containing flaws at Mill *B*. The other principal variable existing was in the reheating of the blooms at mill *A*. The ingots were cut into four blooms which were given a wash heat in reheating furnaces, after which they were rolled into two rails in a rail train of 11 passes. At mill *B* the rail train consisted of nine passes, with no reheating of the blooms."

Two heats at mill *B* were rejected at the drop test because two of the three test pieces broke on the first blow of the tup. The steel of the first heat was reported as being somewhat low in temperature when tapped. While pouring, the nozzle froze up and although the ingots were in the soaking pits an average of 4 hours and 20 minutes, they bloomed cold and rough. The second heat was quite the opposite, the tapping temperature being high and while casting, the stopper head was lost, although the heating and blooming were normal.

Four heats were lost at the drop test because they exceeded the deflection limits. Of the first, all conditions were reported normal except that the ingots were held in the pits for a period of 24 hours. The second heat tapped cold, the pouring nozzle froze and the ingot tops were spongy. The third tapped hot, but otherwise, and like the fourth heat, had normal conditions. The analyses of the rejected heats are contained in Table V.

In the absence of President Kemp, John Birkinbine, of Philadelphia, presided at the session devoted to a discussion of the valuation of iron mines, cast iron and other miscellaneous subjects relating to iron and steel practice. The paper by James R. Finlay, entitled "The Valuation of Iron Mines," is published in abstract elsewhere in this issue. Unfortunately Mr. Finlay was unable to be present and his paper was discussed briefly. One of the speakers, referring to the Cornwall ore deposits of Pennsylvania, stated that taxes had been increased 50 per cent in eight years and that the mines are constantly becoming deeper. Prospecting is being deferred not alone in Pennsylvania, but also in the Lake Superior region, owing to the fact that any ore discovered is taxed years in advance of its use. The method of valuation of ore bodies for taxation, it was stated, should receive careful consideration, as it is of vital importance to the entire mining industry. In Pennsylvania the effort to tax coal in the ground has resulted in a large number of law suits. The estimated valuation of coal land in Pennsylvania

Table IV.

DATA COVERING MILL OPERATIONS.

	Mill A.	Mill B.
Number of furnaces making the steel	6	4
Average size heats cast, pounds	196,000	214,000
Maximum weight heats cast, pounds	128,000	133,500
Minimum weight heats cast, pounds		220,000
Average time metal held in ladle before casting (minutes)	4	15
Maximum time metal held in ladle before casting (minutes)		3½
Minimum time metal held in ladle before casting (minutes)		1
Average number ingots per heat	11	12
Maximum number ingots per heat	1	2
Minimum number ingots per heat	20	23
Average time between casting and stripping	22	28
Maximum time between casting and stripping	13	20
Minimum time between casting and stripping	Hr. Min.	Hr. Min.
Average time between stripping and charging	43	1 7
Maximum time between stripping and charging	2 15	5 55
Minimum time between stripping and charging in soaking pits	24	15
Average time between stripping and charging in soaking pits	16	46
Maximum time between stripping and charging in soaking pits	1 6	11
Minimum time between stripping and charging in soaking pits	3	10
Number of heats between charging in soaking pits and blooming	2 20	2 47
Per cent. of heats between charging in soaking pits and blooming	4 30[1]	6 5[2]
Time in cold heats charges	1 30	1 ..
Per cent top discard	8	none
Time in reheating furnaces, minutes	10 to 13	10 to 12
Average weight, ingots, pounds	20—50	none[3]
Size of ingots, inches	9,740	7,970
Number passes in blooming mill	22 x 26	20 x 24
Size of bloom produced	21 to 25	9
Number of passes in rail mill	7 x 9	8 x 8
Total passes	11	9
	32 to 36	18

[1]One heat in pits 24 hours.
[2]One heat in pits 25 hours.
[3]Mill B rolls direct, does not reheat.

Table V.

ANALYSES OF REJECTED HEATS.

Carbon, per cent.	Phosphorus, per cent.	Manganese, per cent.	Silicon, per cent.	Sulphur, per cent.	Remarks.
0.70	0.015	0.74	0.11	0.034	2 pieces broke
0.57	0.020	0.65	0.08	0.035	2 pieces broke
0.55	0.014	0.65	0.08	0.036	Deflection over limit
0.55	0.017	0.65	0.09	0.037	Deflection over limit
0.60	0.026	0.71	0.11	0.041	Deflection over limit
0.57	0.026	0.75	0.08	0.051	Deflection over limit

varies from $40 to $14,000 an acre and it was suggested that the proper method of assessing any mineral is on the basis of the preceding year's output.

Notes on Cast Iron

Prof. Albert Sauveur presented a paper entitled "Notes on Cast Iron," in which he discussed, to some extent, the various points suggested by J. E. Johnson in his paper entitled "The Effect of High Carbon on the Quality of Charcoal Iron," presented at the October, 1912, meeting of the Mining Institute. Dr. Richard Moldenke, in discussing Prof. Sauveur's paper, stated that the latter assumes that cast iron is a uniform material, although it is anything but uniform in structure. Referring to cupola practice, he said that in tests conducted at the government laboratory, at Pittsburgh, free oxygen had been found in the cupola. He stated that to obtain the best results in melting, it is essential to have the iron at the highest possible temperature in the cupola. Referring to tests for combined carbon, he said that this could not be applied in the foundry, owing to the fact that this would have to be made after the castings were produced. Referring to glass molds, he stated that these contain as high as 3 per cent silicon, although the metal is strong and dense, this condition undoubtedly being brought about by rapid cooling. Referring to the condition of iron in a mold, he said that the appearance of the gates could be taken as a true indicator. If the gate is depressed in the center, the metal in the mold undoubtedly will be satisfactory, but if the surface of the gate is level, the condition of the iron will not be so good. On the other hand, if the top of the gate is raised, it is an indication that the metal in the casting will contain occluded gases.

"The Microstructure of Sintered Iron Bearing Materials," was the subject of a paper prepared by B. G. Klugh, of Birdsboro, Pa., which was illustrated with lantern slides. Herbert F. Miller Jr., of Verona, Pa., described a new design of open-hearth steel furnace using producer gas and Dr. Henry M. Howe presented a paper entitled "Why Does Lag Increase with the Temperature from Which Cooling Starts."

At a meeting of the board of directors, Bradley Stoughton, consulting metallurgical engineer, of New York City, was elected secretary of the American Institute of Mining Engineers.

Otis Steel Co. Bonds.—An offering of $3,000,000 5 per cent first mortgage sinking fund bonds of the Otis Steel Co., Cleveland, has been made in London by the Industrial & General Trust, Ltd., at 93½. The offering is said to have been well received.

Products.	1910 Value.	1910 Per cent.	1911 Value.	1911 Per cent.
Pig iron	$425,115,235	100.000	$327,334,624	100.000
Silver	30 854,500	7.257	32,615,700	9.964
Gold	96,269,100	22.645	96,890,000	29.599
Copper	137,180,257	32.268	137,154,092	41.900
Lead	32,755.976	7.705	36,553,320	11.167
Zinc	27,267,732	6.414	30,964,794	9.460
Quicksilver	958,153	0.225	977,989	0.299
Aluminum	8 955,700	2.106	8,084,000	2.470
Antimony	.....	.....	.....	.....
Antimonial lead	1,338,090	0.314	1,380 556	0.422
Nickel	.....	.....	127,000	0.039
Tin	23,447	0.005	56,635	0.017
Platinum	25,277	0.005	40,890	0.012
Metallic products	760,743,467	178.944	672,179,600	205.349
Non-metallic products	1,242,701,402	292.321	1,245,896 653	380.619
Unspecified	300,000	0.070	250,000	0.076
Total	$2,003,744,869	471.335	$1,918,326 253	586.044
Corn	1,523,968,000	358.483	1,565,258 000	478.182
Wheat	621,443,000	146.182	543,063,000	165.904
Oats	384,716.000	90.497	414,663,000	126.678
Hay	747,769,000	175,898	694,570 000	212.189
Cotton	963,180,000	226.570	859,840,000	262.682
Tobacco	91,459,000	21.512	85,210,000	26.031
Total	$4,332,535,000	1,019.142	$4,162,604,000	1,271.666

VALUABLE TABULATION

Showing Relative Value of Metals and Agricultural Products.

A highly instructive and interesting tabulation showing the comparative values of metallic and non-metallic manufactures and of agricultural products of the United States over an extended term of years, has been compiled by A. Van Winkle, assistant to President E. A. S. Clarke, of the Lackawanna Steel Co., New York City. This tabular work takes pig iron valuation as the base, representing 100 per cent, and the other metals, manufactures and agricultural crops are graduated from this unit in accordance with their money values. The comparison of values, strikingly illustrates the preponderance of crop wealth over manufacturing wealth in this country and the fact that the United States is largely an agricultural nation. To the iron and steel industry, the figures are particularly valuable in showing the relation of its prosperity in any given year to the yield of the farm.

The preparation of the statement represents a prodigous labor on Mr. Van Winkle's part, since the statistics have been derived from numerous government reports and assembled and aligned in their present concise form only after much painstaking effort. A number of leading iron and steel makers have been made recipients of copies of the table, and they have all expressed a high appreciation of the statistical value of its comparisons. The extension of the comparison to cover the year 1912 has not yet been made, because the government reports for that period are not yet available. The comparison for two years is shown by the accompanying table.

Pontiac Will Be Name of New Steel City

Detroit, Feb. 25.—Pontiac has been chosen as the name of the new city which will spring up on the bank of Detroit river below Sandwich surrounding the Canadian plant of the United States Steel Corporation. It is named after the famous Indian chief who played a conspicuous part in the early history of the border. This name has been added to the bill prepared for the incorporation of the new municipality for submission to the Ontario legislature. It is understood the cabinet has approved the bill, which also names the first city officers as follows: Mayor, William Woollatt, of Walkerville; aldermen, Alexander Dawson, William C. Kennedy, Alexander Leslie and Harold R. Hatcher. It is given out officially that construction of the new steel plant will be started at once.

Asks for Dissolution

The Hecla Iron & Mining Co., operating the Hecla furnace near Ironton, O., has asked for dissolution. The old furnace was erected in 1833 and was one of the oldest stacks in the country. Iron for the famous "Swamp Angel," a cannon used at Charleston in the civil war, is said to have been produced by this stack. The original furnace was of stone, but had been replaced by an iron stack, 53 x 10. Operations have been discontinued since 1904 and the furnace owes $85,000, but it has considerable assets. It was formerly operated under lease by the Hecla Charcoal Iron Co., and was advertised as "stopping on Sunday."

MEN OF THE IRON TRADE

O. De G. Vanderbilt Jr., who was recently elected president of the Weir Frog Co., Cincinnati, O., is well known in the iron and steel trade in the east, where his interests in the past have largely been concentrated. His headquarters have been at New York City. For the past four or five months, Mr. Vanderbilt has been located in Cincinnati, in active charge of the extensive additions and changes being made by the company. He will return east next month and in the future spend a part of each month in active management of the business in Cincinnati. He is a son-in-law of the late Col. L. C. Weir, who was president of the Adams Express Co. The Weir Frog Co. was established in 1882, by Fred C. Weir. Upon his death, in 1889, Col. Weir took over the business and assumed the presidency. On his death, 11 years later, B. W. Rowe became president, and retained that position until his election as chairman of the board of directors last month, when Mr. Vanderbilt was elected to the office of president. The general improvements being made at the plant of the company are about completed and will increase the output from 25 to 35 per cent.

F. H. Allison has been appointed general purchasing agent in charge of all office and factory supplies for the American Vanadium Co. and the Flannery Bolt Co., Pittsburgh.

Edward Kropf, former chief clerk at the plant of the American Sheet & Tin Plate Co., Sharon, Pa., has been transferred to Gary, Ind. E. B. Sanger, Pittsburgh, succeeds him at Sharon.

Walter E. Jewell, president of the Jewell Steel & Malleable Iron Co., North Tonawanda, N. Y., is suffering from injuries sustained when a pile of castings fell on his legs, spraining both ankles and breaking a small bone.

Walker Pettyjohn has been elected president of the Glamorgan Pipe & Foundry Co., Lynchburg, Va. Other officers elected at the recent annual meeting include A. M. Campbell, vice president and general manager; H. L. Campbell, secretary-treasurer; Walker Pettyjohn, A. M. Campbell, O. R. Barker, U. B. Winfree, James I. Pritchett, N. D. Eller, G. E. Vaughn, W. H. Miller, H. L. Campbell, J. T. Noell Jr., and A. J. McClure, directors.

Richard C. Schwoerer has been elected president of the Atlantic Radiator Co., Huntingdon, Pa. Judson A. Goodrich was chosen vice president; E. M. C. Africa, treasurer; Albert C. Stein, assistant treasurer; and J. B. Beirn, secretary. The board of directors includes E. M. C. Africa, Joseph Bancroft, Richard C. Schwoerer, F. A. Downes, Albert C. Stein, George L. Townsend, Jr., and Judson A. Goodrich. Mr. Goodrich will continue to act as general manager.

Samuel M. Nicholson has been re-elected president of the American

O. De G. VANDERBILT JR.

Screw Co., Providence, R. I. Other officers elected are: George W. Thurston, treasurer; Lucien B. Copeland, secretary; Benjamin Thurston, superintendent; William G. Smythe, sales agent; Theodore D. Pierce, assistant treasurer, and George F. Staples, assistant secretary. The board of directors, chosen by the stockholders at the recent annual meeting, include Samuel M. Nicholson, Charles Alexander, George L. Shepley, Arthur H. Watson, John Russell Gladding, George W. Thurston and Marsden J. Perry.

Marsden J. Perry, Samuel M. Nicholson, Arthur H. Watson, John Russell Gladding, George Nicholson, Walter W. Griffith and Paul C. Nicholson have been elected directors of the Nicholson File Co., Providence, R. I., for the ensuing year. The directors have organized and elected Samuel M. Nicholson, president and general manager; Arthur H. Watson, vice president; George Nicholson, treasurer; Walter W. Griffith, secretary and assistant general manager; Henry W. Harman, assistant treasurer; Harold C. Field and Paul C. Nicholson, assistant secretaries; Ernest S. Craig, assistant to the president.

Charles F. Brooker was chosen president of the American Brass Co., Waterbury, Conn., at the recent annual meeting of the stockholders. Other officers elected include Edward L. Frisbie, Alfred A. Cawles, Thomas B. Kent and John A. Coe Jr., vice presidents; John P. Elton, treasurer; George E. Cole, assistant treasurer; Gordon W. Burnham, secretary; Franklin E. Weaver, assistant secretary. The board of directors comprises Charles F. Brooker, James S. Elton, Alfred A. Cowles, Arthur C. James, Gordon W. Burnham, John J. Sinclair, Edward Holbrook, Edward L. Frisbie, John P. Elton, Cleveland H. Dodge, Thomas B. Kent, T. Brownell Burnham, John E. Wayland, James A. Doughty and John A. Coe Jr.

George F. Fuller has been re-elected president of the Reed-Prentice Co., machine tool manufacturer, Worcester, Mass. Albert E. Newton and Lucius J. Knowles have been re-elected vice presidents; George E. Newton, general manager; George Crompton, secretary and treasurer, and Charles M. Thaye, counsel. Directors, all re-elected, include George Crompton, Frank A. Drury, George F. Fuller, Dr. Homer Gage, Lucius J. Knowles, Albert E. Newton, Harry W. Smith, Charles M. Thaye and George C. Lee. The company was organized in April of last year with a capitalization of $2,500,000 and resulted from a merger of the F. E. Reed Co. and the Prentice Bros. Co. Vernon F. Prentice, formerly vice president of the company, and his brother, Harry V. Prentice, have resigned as directors.

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Cleveland, February 27, 1913

Blast Furnace Capacity and Performance

A study of our monthly blast furnace statistics throws considerable light upon the question of the total pig iron making capacity of the country, at the same time showing the present degree of employment of the equipment.

The curious thing occurred in January that the total pig iron production of the country reached a new record rate, although the steel works produced less pig iron than in December, 1,990,814 tons in January against 2,000,882 tons in December. The total production in January, however, including ferro-manganese and spiegeleisen, amounted to 2,790,080 tons, against 2,777,292 tons in December. The daily rate in January was 90,003 tons, equivalent to 32,850,000 tons for a year, or, with an allowance of 350,000 tons of charcoal iron, a total output of pig iron for the country of 33,200,000 tons.

There was a large gain in production by the merchant furnaces in January over December, and this occurred not for the month alone, but has been a feature for months past. It is convenient to compare July and January, representing a six-month interval. Comparing these months, there has been an increase of 20.5 per cent in the pig iron production of the steel works furnaces, but an increase of 36.8 per cent in the production of the merchant furnaces.

It is an accepted fact in the trade that for several months the steel works have been operating at practically their full capacity, and the smallness of the gain they have been able to effect even in six months furnishes statistical proof of this idea. It is equally well recognized that the merchant furnaces have not all been in blast, but that many furnaces, normally regarded as fairly well positioned, have been idle for a long time, and even with an increase of more than one-third in merchant furnace output in six months, it remains a fact that many are out of blast.

Based on the January output, the steel works have been making pig iron at the rate of 23,600,000 tons annually, while the merchant furnaces, including charcoal stacks, have been producing at the rate of 9,600,000 tons, making a total of 33,200,000 tons.

While the steel works furnaces in operation can under favorable weather conditions make slightly more iron than they did in January, and while there are some idle steel works stacks, allowance must be made also for the fact that the industry as a whole has been running at high pressure, and a number of stacks will soon have to be blown out for relining. On the whole, it is probably safe to estimate that under normal conditions the steel works can produce about 24,000,000 tons of pig iron a year. While the merchant furnaces have been operating at the rate of 9,600,000 tons annually, they could make somewhat more pig iron under present market conditions, while with the recently augmented supply of coke, at more reasonable prices, and perhaps with a slightly better pig iron market, they could make considerably more. Their capacity, under fairly good conditions, may be taken at from 10,000,000 to 11,000,000 tons.

Thus we have a total blast furnace capacity in the country, under market conditions somewhat like the present, of from 34,000,000 to 35,000,000 tons, and it may be said further that the steel works capacity thus represented is now in practically full operation, while the merchant capacity is in moderately full operation. It would at any rate require only a slight improvement in conditions to make it possible for the merchant furnaces profitably to produce 11,000,000 tons of pig iron in a year. To bring in another million tons of capacity among merchant furnaces, on the other hand, would require an improvement in conditions, from the furnace standpoint, which is hardly to be contemplated. The price of pig iron would have to advance materially, and yet a sufficient supply of coke and ore would have to be furnished, without the furnaces having to pay premiums for such extra supplies. Such a set of conditions can hardly occur this year, and 35,000,000 tons therefore seems to be our extreme pig iron capacity under such conditions as are to be faced. This will be only slightly increased from time to time by new furnaces now under construction or contemplated. New furnaces come in very slowly.

It is well to observe that a capacity of 35,000,000 tons in pig iron is small, rather than large, for the country at this stage of its development, considering

the precedents. In October, 1907, pig iron was made at the rate of 28,000,000 tons annually, and that represented the full capacity available, with prices much higher than those now ruling. Had present market values for raw and finished products then obtained, the output would have been somewhat less. However, from 28,000,000 tons to 35,000,000 tons is only a 20 per cent increase, whereas an interval of almost six years is presented. That is nothing like the rate of doubling every ten years which obtained through 1907.

The Muckraker in the Steel Plant

Never in the history of the iron trade has so much been done for the improvement of conditions surrounding working men as during the past year. In the prevention of accidents, there has been a marvelous change for the better and great progress has been made toward the enactment of fair laws for the compensation of employes or dependents in cases of accident. The old ideas as to compensation have changed rapidly and employers now, almost without exception, are willing to have liberal compensation laws passed. Time honored defenses, such as that of contributory negligence and assumption of risk, are rapidly being abandoned. Legislatures of many states are now hard at work on various forms of employes' compensation measures. Some of these are exceedingly crude and unjust, but out of the conferences of employers, employes and legislators, which are now in progress, some legislation will be evolved which will be a guide to all states in formulating legislation for the compensation of employes. In reducing hours and in other ways, reforms are also being effected.

In spite, however, of the millions of dollars being expended annually for the improvement of conditions of employes, and in spite of willingness to expend much more, unjust descriptions of present conditions continue to be published with criticisms which are absolutely unwarranted. Some of the articles are really ludicrous to one who knows anything about the manufacture of iron and steel. For example, a more or less popular magazine recently published the following:

"Had you ever thought of working twelve hours in one day? At one task? Before a row of two or three thousand-degree furnaces? Amid the rattle of wheels and chains, the roar of air-blasts, the hiss and sputter of metal, and the crack of cannon-like explosions? All about you a vast menagerie of ponderous and awesome machinery, darting long arms, swinging huge caldrons of liquid-fire in the semi-darkness over your head, twirling mighty Bessemer converters with their grumbling molten maws, or pushing past you coffin-like shapes of white-hot metal that glowed incandescently? Always the intense heat, always the presence of danger, always the spur of the speeding up system to keep you stumbling forward, intent on getting out the tonnage?

"Had you thought of doing that for one hour? And then for two? And then for three, and four, and seven, and finally for twelve hours? Had you? . . . . That is the barbaric twelve-hour day which obtains in the steel industry."

Of course, it is perfectly clear to anyone who has visited a steel plant that the author of the above sensational article let his imagination run wild in order to put on paper something that would attract attention. Nevertheless, the article tends to cause an entirely erroneous impression to arise as to conditions in steel plants and to cause sympathetic readers to feel that the employers are really brutal. Perhaps there was the excuse of ignorance for the magazine which originally published this screed, but as much cannot be said for the *Survey*, which copied the article and published it alongside the picture of a very forlorn and downcast individual, who, we suppose, is one of the victims of the heartless system above described. The *Survey*, whose editors know the above article is an outrageous exaggeration, represents a class of people, many of whom are thoroughly conscientious, who ought to be willing to co-operate with employers and employes in improving conditions in iron and steel plants. But as long as this organ of the social workers, philanthropists, and others interested in improving conditions is willing to copy trash like the above from a muckraking magazine, the effect is rather to alienate employers from those advocates of reform. By reasoning together, much could be accomplished, but the cause of progress will be retarded by the dissemination of such articles as the one quoted above.

Influence of John Fritz in Character Building

I believe that John Fritz did more than any other man in the iron business to help the development of the character of the men of my generation. Such sterling integrity, such gentleness in one so very strong, and such perfect simplicity and modesty in one of such extraordinary ability and eminence, were a most impressive object lesson to us.

Henry M. Howe.

Patriotism Demanded

The present very serious situation in Mexico calls for manifestation of most exalted patriotism of all the people of the United States. Never have the very highest and best qualities of President Taft been displayed so splendidly as in his action concerning Mexico, and never has abuse of him been more cruel, more unpatriotic, more unjust than that which charges him with weakly failing to meet the responsibilities of his great office. He has had the courage not to be rash or spectacular. He has done his whole duty just as faithfully as if he had had four years ahead of him in the White House.

This is not a time for any state, however big, to take things in its own hands and invade Mexico. Nor is it the time for this country to yield to foreign clamor or selfish demands in this country and rush into intervention which would probably mean years of war with frightful loss of life and property. It is a time for all citizens of the United States, regardless of party, to support their president.

MINING NEWS FROM THE IRON RANGES

New Gogebic Mine

In section 17, township 47, range 45, southwest of the village of Wakefield, Gogebic range, Selden Rose, a well known mining engineer of Marquette, Mich., is proving up what is already known to be a valuable ore deposit. Mr. Rose was attracted by the appearance of the rock formations while on a visit to the locality and, procuring an option for a lease of the tract, he started exploratory work. A churn drill was employed. Ore was encountered at 30 to 60 feet and it is stated that the deposit already has been proved to a depth of 100 feet and for a length of 400 feet. The mineral is of high grade. The tract is rather more than two miles east of the Asteroids mine and about the same distance southwest of the Brotherton and Sunday Lake mines. It is owned in fee by the Keweenaw association of Boston. The area is practically a virgin field and is one of bright promise. It lies somewhat to the south of the mineralized zone as hitherto shown on the maps and which swings to the north of Sunday lake. The Rose find is south of this body of water. The discovery has attracted considerable attention and other interests have recently started exploratory work both to the east and west. It is believed that the deposits are materially more extensive than those in the ore measure to the north in that part of the Gogebic range. There is increasing evidence that the Gogebic country east of the Montreal river will yield a vastly larger tonnage than was indicated a few years ago. Significant discoveries have been made as far east as the village of Marenisco, and between that point and the Sunday Lake district there is a big stretch of territory that to date has hardly been scratched. Developments of late years not only on the Gogebic, but on the Menominee and Marquette ranges, have been, in fact, amazing to many old-time mining men who once believed the ore zones definitely established by former operations.

Some years ago, George J. Maas, a well-known mining engineer on the Marquette range, invented an instrument for the orientation of diamond drill holes. This device is now quite extensively employed in the Lake Superior iron district. Mr. Maas has recently received some letters from England, inquiring about this invention. One of the strongest features of the instrument, it is claimed, is its ability to withstand almost any kind of usage, also it is very small and can be transported from place to place without great expense.

Ashland Mine Reopened

The Hayes Mining Co., which a short time ago assumed control of the Ashland mine at Ironwood, Mich., previously operated for some nine or ten years by the Cleveland-Cliffs Iron Co., will repair No. 9 shaft with steel sets, instead of wooden ones. Some of the steel has already been received and the remainder is promised soon and in such quantities that there will be no delay in framing and setting up. The old timbers are to be taken out of the shaft for a distance of 1,500 feet. The draft in No. 9 shaft is downward, so that the work of replacing will be started on the fifth or sixth levels; ice and cold would interfere with the work nearer the surface. The rebuilding of the shaft is a big undertaking and will require several months.

The property was surrendered Dec. 1, and the Hayes interests at once took charge and began preparing for a resumption of mining work. Practically all of the equipment installed by the Cleveland-Cliffs company was purchased by the Hayes Mining Co.

Mine Fires

Fire in the shaft at the Biwabik mine, Biwabik, Minn., on the Mesabi range, has occasioned a shortage of water in the town which has just been relieved by laying 4,000 feet of pipe to the Ruddy mine. The fire in the Biwabik shaft is now out, but it was found that nearly all the timbers are so burned as to make it necessary to reline the shaft. This will take from ten days to two weeks.

Reports of a fire in the shaft of the Euclid mine, near Chisholm, Minn., were greatly exaggerated. Manager LeBrec reports that the fire was confined to a small tar-paper s'ack on the top of a stockpile.

Miners Wanted

As is the case in the Gogebic district and in some other fields, Marquette range companies have employment for additional mine workers. While some properties are operating with full crews, others are in need of 20 to 100 men, aside from those now in service. Additions of several hundred will be required when the Rogers-Brown interests and the Cleveland-Cliffs Iron Co. resume operations in the Michigamme field. Men who will work underground have no occasion to be idle in the Marquette district this winter, as they can procure employment in almost any mine in which they desire to work. The Cleveland-Cliffs company's Negaunee property, for one, is in need of miners, places for an increased force having been provided since the new shaft was put in commission a few months ago. The coming season will be a record-breaker for the range. More mines are active than for years past. The railroads are making preparations to handle an increased tonnage. It is believed that labor will be more plentiful in the spring.

The action of the United States Steel Corporation in readjusting wages, especially those of surface men, an example followed by the other leading mining interests, naturally has caused much satisfaction amoung the workers. The adoption of the new scale was entirely voluntary, no demands having been made. It is doubtful whether mine workers anywhere are accorded better treatment than in the Lake Superior country, and the conditions under which they work also are very favorable. The principal companies are doing everything possible to prevent casualties. Since the 8-hour day was introduced in various districts, the men affected have been better satisfied than ever before. The better class of miners are receiving as large checks as they ever did and underground men with little or no experience also are paid well. In past years, contract miners and trammers would receive only what they earned under the terms of their agreements, while under the present system miners who are unfortunate are guaranteed a minimum wage rate.

CONTINENTAL IRON AND STEEL MARKETS

LUXEMBURG IRON TRADE

Esch, Feb. 6.—The position in the Luxemburg minette ore business is one of continued great activity in consequence of the strong and well maintained demand on the part of the iron industry, which continues rather to intensify, and producers have about reached the limit of their capacity for delivering ore. It is as a matter of fact practically impossible to conclude further transactions in silicious minette. In any case, of recent years business has been very restricted in minette ore which all over the Luxemburg basin is held in very strong hands. The same observation applies to the Lorraine basin, whereas by far the greater portion of the French Briey basin is chalky ore. The prices of Luxemburg ore on the open market run about 32 marks ($7.52) per ton and for silicious minette about 30 marks ($7.05) all ex river-quay.

GERMAN IRON TRADE

Berlin, Feb. 6.—The feature of the pig iron market is still the extraordinary shortage of supplies which compelled the syndicate to refuse a number of orders for export. Mills at home find it very difficult to obtain supplementary supplies needed in addition to those contracted for some months ago, even at a substantial premium. The pig iron syndicate is trying to relieve the situation by buying iron in England to meet the most urgent requirements. Half products are also still scarce and deliveries on specification often inconveniently in arrears. The bar iron market remains, however, very unsettled. Merchants, strongly suspected to act in agreement with certain big producers, have continued underselling of late, and while official quotations show no change, consumers experience no difficulty whatever in having materially lower bids accepted. Finished materials have ruled very quiet for the past few weeks, as far as fresh business is concerned and rumors are current of export prices having been shaded in order to encourage the placing of orders, particularly in the lighter branches of the trade, in which, however, thin and thinnest wire form an exception with unusually heavy orders on hand. The Siegvalley Iron Ore Syndicate has raised prices 30 pfennig (7.05 cents) to 50 pfennig (11.75 cents) per ton for contracts to the end of the current year. Hoop iron mills have still orders on hand until well into the second quarter. The Shipplate syndicate shipped from works during December 36,000 tons, and booked new orders for 35,000 tons. The total unfilled orders on its books on Jan. 1 amounted to 224,000 tons, and booked during January further about 25,000 tons, making the present aggregate orders roughly 250,000 tons or about 100,000 tons more than the total annual allotted output of its members.

BELGIAN IRON TRADE

Brussels, Feb. 5.—While the pig iron market continues firm and active, and in many sections of the furnishing department, notably rails and rolling stock, conditions are highly satisfactory, the irregularity which for some time past has here and there been noted tends to assert itself in a more pronounced manner. The continued political uncertainty, the tension in the money markets, and now the resumption of hostilities, have effectively curtailed enterprise, and but for the well garnered order-books with which almost without exception the mills entered the period of political crisis, the effect would weeks ago have become serious. It is this record activity of business which prevailed in the early autumn which has enabled the Belgian iron trade to maintain prices throughout practically at their highest. The long absence of fresh export orders has, however, recently created a much keener competition for fresh work amongst the mills, especially in the case of heavy staple lines, such as bars. Steel bars for export have been occasionally selling 2s (49 cents) lower during the past week at £5 18s ($28.72) to £6 ($29.21), and iron bars at £6 1s ($29.45) to £6 2s ($29.70) per ton f. o. b. Antwerp. Hoop iron is also 2s (49 cents) lower at £7 2s ($34.58) to £7 4s ($35.06), but plates and sheets have been in request and their prices have hardened 1s (24½ cents) to £6 14s ($32.62) to £6 15s $32.86, and £7 3s ($34.82) to £7 5s ($35.31), respectively. The State railways have accepted tenders from Belgian engineering firms for the supply of 62 locomotives.

SPELTER PRODUCTION

In 1912 Shows Large Gain Over Preceding Year.

Statistics compiled by C. E. Siebenthal, of the United States geological survey, have just been published, showing the production of spelter in the United States in 1912 in tons of 2,000 pounds. The output of primary spelter was 338,806 tons, compared with 286,526 tons in 1911, an increase of 52,280 tons, or 18.2 per cent. The consumption of primary spelter was 340,372 tons, compared with 280,059 tons in 1911, an increase of 60,313 tons, or 21.5 per cent. The production of spelter in the world was 1,063,121 tons, compared with 978,695 tons in 1911, an increase of 84,426 tons, or 8.6 per cent. Apportioned according to the locality in which it was smelted, the following division is made: Illinois, 88,397 tons, compared with 83,130 tons in 1911; Kansas, 101,104 tons, compared with 98,413 tons; Oklahoma, 76,925 tons, compared with 46,315 tons, and other states, 72,380 tons, compared with 58,668 tons. Divided according to the source of the ore, Missouri was by far the largest producer with 149,557 tons, compared with 127,540 tons in 1911; Colorado ranked next with 60,841 tons, compared with 42,233 tons, and Wisconsin was third with 34,137 tons, compared with 31,809 tons. Canada produced 4,199 tons, compared with 1,598 tons, and Mexico's output was 10,700 tons, compared with 13,307 tons.

In 1912 the United States, with its production of 338,806 tons of spelter, represented 31.9 per cent of the world's output of 1,063,121 tons, compared with 29.3 per cent in 1911, when the world's output was 978,695 tons, of which the United States produced 280,059 tons. Germany ranged second in output, its 1912 total being 298,810 tons, compared with 276,008 tons in 1911, and Belgium was third with 220,690 tons, compared with 215,050 tons.

PICTORIAL DISPLAY

Of Iron Industry Seen by Large New York Assemblage.

Before an audience that crowded the large auditorium of the Engineering Societies' building, West Twenty-ninth street, New York City, Tuesday evening, Feb. 18, the Mine to Molder motion pictures of Rogers, Brown & Co., were presented under the direction of H. B. B. Yergason. This was the initial appearance of the now famous motion pictures in New York City. Included in the audience were a number of ladies. A. A. Fowler, New York resident partner of Rogers, Brown & Co., in introductory remarks, explained the purposes under which the pictures had been prepared and exhibited. During the intermissions in the presentation of the pictures, the audience was entertained by several vocal selections and clever impersonations by Noah H. Swayne, manager of the Philadelphia office of Rogers, Brown & Co.

Shipbuilders Busy

Detroit, Feb. 24. — According to Courtland D. Cramp, of Philadelphia, member of the big ship building corporation, the construction of the Panama canal is proving a great stimulus to merchant marine building despite the failure of congress to enact a ship subsidy law. Mr. Cramp has been in the city for several days to secure orders for motor bearings manufactured by the Cramps. "We are now building at our yards along the Delaware," said Mr. Cramp, "four 12,000-ton coast vessels designed for use in the Panama-Pacific trade when the canal shall have been completed. The boats are being constructed for W. R. Grace & Co., for freight and passenger traffic." Mr. Cramp excused himself from discussing work being done for the government in the shape of war vessels further than to say that seven torpedo destroyers were under construction.

Will Deliver Address

James F. Kemp, past president of the American Institute of Mining Engineers, and professor of geology at Columbia university, will give a paper on the Catskill aqueduct, of New York City, at the monthly meeting of the Engineers' Society of Western Pennsylvania, at Pittsburgh, Feb. 25. One of the features of the paper will be the aid which geologists have rendered in the consummation of this engineering work.

The Engineers' Society of Western Pennsylvania has been forced to abandon its proposed trip of inspection to Panama on account of the action of the Hamburg - American steamship line in changing the sailing date of the vessel desired. The accommodations on the vessel offered were too limited to be considered.

OFFICIAL STATEMENT

Concerning Recent Car Orders of the Pennsylvania Railroad.

The Pennsylvania Railroad Co. has issued the following statement concerning recent car orders:

The Pennsylvania Railroad Co. has just placed orders for 2,305 railway freight cars. Of these cars, 1,000 refrigerators and 500 steel and wood gondolas will be built by the American Car & Foundry Co., at Berwick, Pa., and 805 steel and wood gondolas by the Standard Steel Car Co., at Butler, Pa.

All of the above are for replacements on the Pennsylvania lines east of Pittsburgh. The new cars will be of 100,000 pounds capacity, taking the place of cars of 60,000 pounds average capacity. This equipment will thus represent a net increase in carrying capacity of 46,100 tons.

The gondola cars will cost approximately $1,215 each, and the refrigerator cars will cost $2,010 each, or about $200 more than similar cars cost six months ago. Each of the gondola and refrigerator cars requires about 40,000 pounds of steel. The execution of this order, therefore, will require at least 46,100 tons of steel, exactly the amount of net increase in Pennsylvania railroad carrying capacity. The total cost to the railroad company for these replacements will amount to approximately $3,595,575.

The foregoing are in addition to the 10,000 new cars ordered a few days ago. Of these, the Pressed Steel Car Co. will build 2,000 at McKee's Rocks, Pa., and 500 at Hegewisch, Ill.; the Standard Steel Car Co. will build 1,500 at Butler, Pa.; the Cambria Steel Co. 4,500 at Johnstown, Pa., and the Ralston Steel Car Co. 500 at Columbus, O. In addition, the American Car & Foundry Co. will build 1,000 cars at its plants.

The execution of the above orders, amounting to a total of 12,305 cars, will require 286,100 tons of steel, and a total outlay on the part of the railroad company of $17,036,575.

Car Inquiries

Car inquiries as follows were pending Feb. 15:

Boston & Maine, 3,500 to 4,000 cars, mainly box type.

B. & O., 1,000 hoppers and 500 refrigerator cars.

The Seaboard Air Line, 1,500 cars.

The Norfolk & Southern, 500 cars.

The C. & O., 3,000 cars.

The Havana Central, 740 freight cars.

The Mineral Range, 100 all-steel rock cars.

The Missouri, Kansas & Texas, 1,000 drop-bottom stock cars.

GOOD ORDERS

For Structurals Were Placed During Past Week.

Structural contracts and contracts for shapes and plates for vessels for the week ending Feb. 22, were as follows:

Bridge at West Ellwood, Pa., for the Pittsburgh & Lake Erie railroad.

Pipe bands, Portland, Ore., 3,000 tons, to Colorado Iron & Fuel Co.

Davenport hotel, Spokane, Wash., 2,170 tons, to the Minneapolis Steel & Machinery Co.

Stewart apartments, Chicago, 1,138 tons, to the American Bridge Co.

Deardoff building, Kansas City, Mo., 904 tons, to the American Bridge Co.

Warehouse in Philadelphia for Larkin & Co., 1,400 tons, to the McClintic-Marshall Construction Co.

Passaic Valley sewer, Newark, N. J., about 18,000 tons of plates, to Booth & Flynn, Pittsburgh.

Section 8, Queens elevated line, New York City, 24,000 tons, formally awarded to American Bridge Co. Carnegie Steel Co. to furnish about 10,000 tons of plates for the work.

Battleship Pennsylvania, 15,000 tons plates, to Carnegie Steel Co. Armor not included.

Penn Mutual Life Insurance Co., Philadelphia, 2,700 tons, formerly awarded to American Bridge Co.

Standard Mail Order Co. loft, New York City, 2,000 tons, to the Harris H. Uris Iron Wks.

Heyward, Strasser & Voight lithographing building, New York City, 1,600 tons, to Levering & Gerrigues.

High school, Elizabeth, N. J., 700 tons, to Fabian Iron Wks.

Lining Record of Jisco Furnace

The stack of the Jackson Iron & Steel Co., Jackson, O., which was recently blown in after having been relined, had operated for four years and three months on one lining. The furnace was relined in five weeks, the brick work being done by the P. J. Brown Construction Co., Cleveland, and the fire brick furnished by the Davis Fire Brick Co., Oak Hill, O. The Jackson company makes high silicon iron.

Issue Annual Ore Book

E. N. Breitung & Co., Cleveland, have just placed before the trade their annual ore analysis book, giving analyses of the ore cargoes of last year and the guarantees for this season. The book is handsomely bound and covers the 18 grades of ore handled by the company from the Marquette, Menominee and Michipicoten ranges.

The Weatherly Foundry & Machine Co., Weatherly, Pa., has bought the abandoned Lehigh Valley Machine shops, consideration, $10,000.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, the machinery business, as compared with November and December of 1912, has fallen off, but order books since Jan. 1 are well ahead of the corresponding date of last year. The largest single source of machine tool business during the past week was the New York Central railroad. Orders were placed with a number of New York houses, aggregating about $30,000, by that company. It is said that this closes up the list of specifications sent out last December. Renewed interest is noticeable in the large list put out by the Central in 1911, on which action was never taken. There was some talk late last fall of a request for revised bids being made and it is thought likely that the matter may be taken up in the near future. There is evidence that the Pennsylvania Railroad Co. will inquire for bids on a large aggregate of shop equipment before very long. Some houses are informed that a list will be sent out next month. The Willys-Overland Automobile Co. is said to have placed an important order through western agents of eastern companies for machine tools recently. There is a number of inquiries before crane builders, out of which some excellent business is expected. Bids are going in on a 20-ton four-motor electric traveling crane for the navy yard at Portsmouth, N. Y. These will be opened March 8 at the Navy Department, Washington, D. C.

In Pittsburgh, an unusually good volume of business continues to be enjoyed by machine tool builders, and builders and shops making heavy machinery are well provided with orders. Cranes continue to be in good demand. It is probable that the Pittsburgh Crucible Steel Co. will shortly award contracts for 23 cranes of miscellaneous types. The Des Moines Bridge & Iron Co. has closed for a lathe and shaper, and the Carnegie Steel Co. has purchased a double angle shear. All types of machine tools are under negotiation and the second hand tool business continues to be strong.

In Chicago, prospects for future business in machine tools are very bright, although most of the dealers report a very quiet week. This, however, is but a natural result of the brisk activities of the previous ten days. A number of large users of machine tools are planning extensions concerning which something definite will materialize in the very near future. A number of western railroads are still in the market. The Santa Fe is inquiring for a heavy grinding machine, and the requirements of this road are understood to be very large, but no lists covering any material number of machine tools have been issued. The Wabash will shortly close on the requirements covered by its recent list. The Pere Marquette is still in the market for tools, as previously reported.

In Cleveland, dealers in machine tools continue to enjoy a satisfactory volume of business. The heavy resumption of buying inaugurated the middle of January has continued and delivery is again becoming an important factor for both buyer and seller to consider. No large lists were received in that district last week, the inquiry from the central Ohio steam shovel interest being the largest before the trade. However, a number of small-sized inquiries are pending and prospective business is heavy. All grades of tools are active.

In Cincinnati, the labor question is being given more consideration at the present time than anything else, as there is an extreme shortage there of both skilled machinists and laborers. One large machine tool maker in that city is anxious to put on a night shift, but there is not sufficient help available to do this, and another large machine tool plant which has been running a night shift for some time, reports that it could use several more men. Business is still somewhat irregular and unchanged as to the volume of new orders placed. As a general rule, there is more foreign business being done than domestic, the latter being confined, to a large extent, to the makers of electrical equipment. There is, however, much domestic buying in sight, but it will hardly develop before the second half of the year, if by that time. In the meantime, a number of small orders are constantly being placed, which indicates that the buying at present is only for actual requirements, and that the prospective buyers are holding off from taking the machines in large numbers that they will be forced to have before the end of the year.

ALABAMA

The Covington Mfg. Co., Headland, has been incorporated to manufacture implements; $10,000.

Enlargement of the Gadsden car works of the Queen & Crescent system is planned to nearly double capacity, according to an official of the company.

Work on the new stack for the Woodward Iron Co., Woodward, is proceeding, and the company expects, with good weather, to be able to blow it in by April 1. This will give the company two 400-ton furnaces.

ARKANSAS

As a result of fire that destroyed the Auten building, Little Rock, plans for a 16-story steel block have been hastened.

The Garland Power & Development Co., Little Rock, controlled by Ford, Bacon & Davis, New York, has decided on plans for the construction of a large hydro-electric power plant on the Ouachita river, about 50 miles from Little Rock. It will be the fourth of a chain supplying power to communities and industries in the eastern part of the state.

CALIFORNIA

The Pacific Heating & Mfg. Co., Los Angeles, has been incorporated; $50,000; directors, G. A. Lyster, L. Giles, E. C. Kent, J. W. Summerfield, N. C. Folsom.

The Pacific Metal Products Co., Los Angeles, which recently increased

its capital from $500,000 to $1,500,000, has absorbed the F. L. Moore Motor Truck Co., capitalized at $250,000. Auto trucks and parts will be made.

The Western Pacific railway is erecting general machine shops at Sacramento, which will be completed in April. The company advises that the machinery has all been purchased, some of it now being on hand.

The Hanford Scraper Co., Hanford, advises that a new factory is being built at that place for the manufacture of a patented scraper. New equipment is required. The company also advises that it is desirous of getting in touch with an eastern concern to manufacture the scrapers for them.

CONNECTICUT

The plant of the C. M. Shay Fertilizer Co., New London, is to be rebuilt at once.

The Binns Revolving Suction Roll Co., Norwich, has been incorporated to manufacture machinery; $150,000.

The John T. Young Boiler Co., Norwich, has in the course of construction a foundry building, 136 x 66 feet.

The Waterbury Standard Tool & Machine Co., Waterbury, has been incorporated to manufacture machinery, tools, etc.; $10,000.

Fire Feb. 20 seriously damaged the plants of the Trumbull-Vanderpoel Electric Co. and the Flynn & Doyle Carriage Mfg. Co., at Bantam.

The Waterbury Brass Co., Waterbury, is to build a new power house and coal storage plant, 68 x 109 and 79 x 132 feet, of steel and brick.

The Hartford Auto Pump & Supply Co., Hartford, has been incorporated; $50,000; by Henry P. Schale, Edward E. Tryon, Thomas Lockwood.

The National Folding Box & Paper Co., New Haven, is to erect a fireproof warehouse structure, 100 x 200 feet, five stories, adjoining its plant.

It has been announced that the C. M. Shay Fertilizer Co., Groton, will rebuild in the near future the plant which was destroyed by fire recently.

The United Illuminating Co. has plans for a brick and steel addition to its power station on Grand avenue, New Haven. The building will be 58 x 80 feet, one story.

Four new buildings are under construction at the plant of the Blakeslee Forging Co., Southington. The buildings will soon be ready for installations of equipment, a part of which has not been closed.

The D. E. Whiton Machine Co., New London, is about to install some new boilers. It is also finishing up a new department which will be devoted to its automatic and hand screw machines. It will install some new automatic and hand screw machines. The company has just received some new tool room equipment and recently installed a new 36 x 36-inch x 10-foot planer.

DELAWARE

The Rice Gasoline Drill Co., Wilmington, has been incorporated to manufacture drills, engines and other machinery; $2,500,000.

The Lyman-Beeman Co., Dover, has been incorporated to manufacture and deal in iron and steel and building materials; $50,000; by W. F. P. Lofland, Dover.

The Non-Metallic Milling Co., Wilmington, has been incorporated to mine and mill all kinds of ores and minerals; $50,000; by George G. Steigler, Edmund S. Hellings and William M. Pyle.

DISTRICT OF COLUMBIA

Shipbuilding during January added 24,402 tons to United States vessel tonnage. Seventy-nine vessels were constructed, 67 of wood and 12 of steel. Thirty-seven vessels aggregating 18,156 tons were built on the Atlantic and Gulf, and 27 aggregating 5,032 tons on the Pacific coast. The largest steel steam vessels were the Santa Cruz, 5,081 tons, built at Philadelphia; the Norfolk, 3,521 tons, at Camden, N. J.; Oliver J. Olsen, 1,881 tons, at Wilmington, Del., and the William Chatham, 1,600 tons, at San Francisco.

The United States Treasury Department, O. Wenderoth supervising architect, advises that the following construction work and furnishing of equipment is open for sealed proposals, specifications for which may be secured upon application:

Construction complete, including mechanical equipment of the United States post office at Concordia, Kans. The building is two stories and basement with a ground area of approximately 4,750 square feet.

Fire escapes and elevator shaft enclosures for the United States Appraiser's Warehouse at New York City.

Construction complete, including mechanical equipment of the United States post office at Rolla, Mo. The building is two stories with basement and has a ground area of approximately 3,960 square feet.

Construction complete, including mechanical equipment of the United States post office at Ottawa, Kans. The building is one story with basement, and has a ground area of approximately 4,800 square feet.

FLORIDA

The Taylor County Lumber Co., Perry, recently ordered a modern band saw mill from the Wheland Co., Chattanooga, Tenn. Peter Kuntz is president of the former company, with head offices in Dayton, O.

GEORGIA

After 25 years in the same location, the Malsby Machinery Co., Atlanta, has removed to new quarters at 438-440 Marietta street.

The Georgia Harrow & Implement Co., Tifton, is being incorporated to manufacture harrows and other articles; $15,000; by J. D. Cook, R. S. Short, J. H. Brown.

ILLINOIS

The Great Northern Mfg. Co., Chicago, has changed its name to the Standard Talking Machine Co.

The McIntosh Foundry & Machine Co., Monmouth, has certified to a change of name to Maple City Foundry & Furnace Co.

The Miller Safety Locks Co., Chicago, has certified to the secretary of state a change of name to Elevator Locks Co.

A permit has been granted to the People's Gas Light & Coke Co., Chicago, for the erection of a one-story brick addition to the plant at 1148 Torrence avenue, estimated cost, $10,000.

The Morris Iron & Machine Co., Springfield, whose incorporation has been mentioned, has bought the plant and yards of the Culver Construction Co., Ninth and Madison streets, in Springfield.

The Advance Mfg. & Novelty Co., Chicago, has been incorporated with a capital of $10,000, to do a general manufacturing business. The incorporators are William D. Martin, J. J. Kratz and C. W. Jones.

The Galesburg Utility Co., Galesburg, has been incorporated with a capital of $5,000 to do a general electric light, telephone and telegraph business. Geo. B. Churchill and F. C. Woods are among the incorporators.

The Tri-State Traction Co. expects to begin construction on its interurban line between Hamilton and Quincy by the first of June. The company advises that its machine tool, rolling stock and rail requirements will be announced as soon as it is ready to receive bids.

The Machinery & Motor Co., Quincy, recently incorporated with a capital of $2,500, will not erect a new plant at present. The company had taken over the plant recently occupied by the Kurz Machine Co., and has equipment sufficient to meet present needs. Some new machinery may be required at a later date.

At the close of the recent Springfield Good Roads convention a delegation from Lasalle conferred with the State Highway commissioners on a question of building a perma-

nent roadway from the Rock Island depot at Lasalle to a point one mile south. This conference resulted in plans and estimates for the work being prepared by the State Highway engineer, and in arousing interest among the producers of roadway material in that state. This interest resulted in the material for practically one mile of concrete road being donated by certain sand, gravel, and cement companies.

Plans have been completed for a water works at Rockdale, which include the erection of a 90,000-gallon steel tank. George C. and Arthur M. Morgan, 160 West Jackson boulevard, Chicago, are the engineers. The bond issue will be voted on at the April election and if carried, construction work will be begun at once.

INDIANA

The Indiana Rubber & Insulated Wire Co., Jonesboro, has increased its common stock from $200,000 to $500,000.

The Lee Canning Co., Pendleton, advises that its new factory has been completed and nearly all of its machinery purchased and installed.

The machine shop of George Montgomery, Greensburg, was destroyed by fire recently, the loss being $20,000. It will probably be rebuilt.

The George Loring Co., Indianapolis, has been incorporated to manufacture and sell electrical machinery; $10,000; directors, George Loring, Ralph S. and Grace S. Howell and Charles M. Reagan.

The Indianapolis Aluminum Castings Co., Indianapolis, has been incorporated to manufacture aluminum and its products; $50,000; by W. M. Johnson, J. F. Bailey and Alfred Potts. It plans to build a plant.

The Capitol Body Co., Indianapolis, has been formed to manufacture metal automobile bodies; $10,000; by Elmer Himshaw, Fred W. Henschen, Elmer W. Hughey, W. A. Lyons and R. Coghill.

The Indiana legislature has authorized the expenditure of $16,000 for the purchase of new boilers to be installed in the state reformatory at Jeffersonville. D. C. Peyton is superintendent of the institution.

The National Motor Vehicle Co., Indianapolis, advises that its new factory building has been completed. The building is three stories and contains 20,000 square feet, the first floor being used for machine shops. Most of the machinery has been installed.

The National Automatic Tool Co., Richmond, has been formed to manufacture tools and machinery; $150,000; principal stockholders, William F. Bockhoff, Louis F. Bockhoff, Julia C. Bockhoff, Jesse Weichman and George H. Eggemeyer.

The Universal Tractor Co., recently incorporated with a capital of $100,000 for the manufacture of motor-driven farm machinery, has located its plant at New Castle, and all machinery requirements at present have been purchased and installed. The officers of the company are as follows: T. B. Funk, president and general manager; H. E. Bonebrake, vice president; J. E. Kepperly, secretary, and M. J. Abbott.

IOWA

The plant of the Fort Dodge Sheet Iron Boiler Works, Fort Dodge, will probably be enlarged in the near future.

The Fischer Artificial Ice & Cold Storage Co., Dubuque, has been incorporated with a capital of $100,000 to build and operate an artificial ice manufacturing plant.

The Chicago & Northwestern has completed plans for new repair shops at Clinton, which are to cost, when fully equipped, in the neighborhood of $500,000. Contracts will be let so that the work will be started early this spring. The shop will be located where the company has ample ground for other enlargements from time to time as may be necessary in the future. The construction of the new shops precedes the probable erection of a new passenger station on the present location of the old shops. When the new structure is completed, the old one will be dismantled and work started on a new station. The Northwestern is also contemplating some improvements at Missouri Valley.

KANSAS

The Star Mfg. Co., Wichita, has been incorporated to manufacture an automatic stock feeder and steel fence posts; $20,000; president and general manager, A. M. Smith; vice president, S. F. Webb; secretary and treasurer, L. L. Woods.

KENTUCKY

A road grader is to be purchased in the near future by the fiscal court of Woodford county, Versailles. Road Supervisor W. H. Edwards is in charge.

The Smith Fireproof Construction Co. has the contract for the erection of a jail at Hazard, and will require a large amount of structural material.

M. J. Moss, Pineville, will open a large coal mine near Harlan, Ky. Machinery will be bought for it as soon as a railway extension is completed. Power equipment, including a boiler, engine, air compressor, etc., will probably be required.

The St. Bernard Mining Co., Earlington, is to electrify its operations and will buy a steam turbine, generator and motors.

The Louisville & Nashville railroad has purchased property in Louisville, and will establish extensive yards and repair shops in that city.

Report is made that the Abigail Mining Co., Danville, is preparing to develop lead and zinc mines and build a smelter in the Joplin, Mo., district.

Modern steel towers probably will be used for a new transmission line the Ohio Valley Electric Co. is planning to construct between Ashland, Kenova and Ironton.

The Straight Creek Lumber Co., Pineville, will be in the market for power and sawmill equipment, having purchased a large tract of hardwood timber near Pineville, which is to be developed at once.

The Standard Sanitary Mfg. Co. will erect a nine-story reinforced concrete warehouse at Sixth and A streets, Louisville. Brinton B. Davis, architect of that city, has plans and specifications ready and is taking bids on the construction of the plant.

Having completed its purchases of pumps, the America Creosoting Co., Louisville, is still in the market for motors, as several of the pumps are to be electrically operated. Bids will be received within a few weeks by the purchasing agent.

The Louisville & Nashville Railroad Co. has purchased a 500-kilowatt turbogenerator for installation in its South Louisville shops. The company has been enlarging the capacity of its power plant steadily. All of its equipment is motor-driven.

Webster Gazlay, National Concrete Construction Co., Board of Trade building, Louisville, will have plans and specifications for a reinforced concrete powet plant of the Seelbach Hotel Co. ready by March 1. The hotel has increased its capital stock $150,000 to provide for the improvement.

George W. Atkinson, Louisa, who has a franchise for a water system in Paintsville, will purchase two pumps and two 50-horsepower engines in the near future for installation there. He is personally in charge of the construction work.

The Commercial Club of Louisville is considering plans submitted to it by a special committee looking to the organization of a corporation with $500,000 capital stock for the purpose of bringing new industries to the city. The plan of the new company is to take stock

in manufacturing concerns locating there, as well as securing factory sites at low prices.

The Louisville & Nashville Railroad Co. has announced plans for the equipment of large repair shops at Lexington, at a cost of $500,000. The purchases of machine tools, woodworking equipment, etc., which will be needed will be made at the general offices in Louisville.

The Covington Architectural Iron Works, Covington, has secured the contract for the iron and steel to be used in the new building of the Windisch-Muhlhauser Brewing Co., Cincinnati. Several hundred tons of structural and architectural iron and steel will be required.

The Louisville & Nashville Railroad Co., which has arranged to share the expense of building two reinforced concrete viaducts in Lexington, will prepare the plans for them. Preliminary drawings already have been made. The cost of the improvements will be approximately $120,000.

Efforts of the manufacturing committee of the Covington Industrial club, Covington, have secured a new location for the Cincinnati Pulley Machinery Co., recently driven from its plant by fire. The temporary location will be in a building on Madison avenue known as the Acme garage.

The Houser Mfg. Co., Louisville, which has operated a brass foundry and finishing shop, has been succeeded by the American Brass & Plating Works. Richard M. Houser continues as manager. Officers are: President, Thomas J. Hines; vice president, John J. Brennan; secretary-treasurer, James H. McGill.

The Wood & Turner Co. has been organized in Louisville to manufacture elevator and flour milling machinery. The concern has established a plant at 823 South Fifteenth street, Louisville, and has practically completed purchasing its equipment. It will begin turning out its product within 30 days. Fred Turner is vice president and general manager.

LOUISIANA

The Dixie Culvert & Metal Co., Atlanta, Ga., advises that its new plant just being opened in New Orleans will manufacture corrugated culvert pipe, tanks, etc., and will specialize on rust-resisting American ingot iron products. The equipment for the plant is already bought and the plant will be started on or before March 1. The company is operating factories in Greensboro, N. C.; Jacksonville, Fla.; East Point, Ga.; Little Rock, Ark.; Shawnee, Okla., and New Orleans.

MAINE

The Otis Elevator Co., New York, has filed a certificate of incorporation in Maine, capital stock, $100,000. Officers are named as follows: President, Morgan M. Mann; clerk, James E. Manter, and treasurer, A. F. Jones.

The American Nut-Lock Co., Portland, has been incorporated to do a general business in manufacturing and operating patents; $10,000; president, James A. Crane; clerk, Asa W. Sullivan; treasurer, C. N. Haskell; directors, A. W. Sullivan and J. A. Crane, Portland.

The Orono Pulp & Paper Co., Orono, is about to begin the construction of a hydro-electric plant at Stillwater. There will be four main units and two exciters in concrete flumes. The contract for the water wheel equipment has been placed with the S. Morgan Smith Co., York, Pa.

MARYLAND

The stockholders of the Landis Tool Co., Waynesboro, recently voted to increase the authorized capital of that company from $500,000 to $1,000,000.

C. M. Anderson, Baltimore, is preparing plans for a brick and steel addition to the works of the National Enameling & Stamping Co., on Light street, that city.

The Carnegie Steel Co. recently purchased a double angle shear to cut up to 8 x 8 x 1-inch. The shear, which will be run on a turn table, motor driven, will be installed in the company's warehouse at Baltimore.

MASSACHUSETTS

Broman, Dow & Co. were among the heaviest losers in a fire in Boston, Mass., Feb. 20. The firm's pipe warehouse was destroyed.

S. Porter & Co., Worcester, has been incorporated to manufacture machinery; $75,000; by W. A. Bigelow and A. L. Clarkson, of Worcester.

The Wright Wire Co., Worcester, and Palmer, is to demolish its power plants, having entered into a 10-years contract with the Connecticut River Transmission Co. to have power furnished for both plants.

The Wire Goods Co., Worcester, is to erect an addition to its factory at 28 Union street. The new structure, which will be devoted largely to offices, will be 70 x 35 feet, two stories. Plans were prepared by Frost & Chamberlain, and E. D. Ward has the general construction contract.

The Chapman Valve Mfg. Co., Indian Orchard, has acquired the business of manufacturing Anderson couplings, formerly carried on by the Pratt & Cady Co., Hartford, Conn. The purchase includes the patterns, tools and machinery formerly used in the manufacture of the couplings, which are used extensively by gas and water companies.

The Worcester Electric Light Co., Worcester, is to purchase a 5,000-kilowatt turbine, two 750-horsepower boilers, new automatic stokers and condensing apparatus for installation in its Webster street plant. A meeting of stockholders of the company has been called for March 12, to decide upon the date for issuing the 2,000 shares of new stock, which will increase the capitalization of the company to $1,200,000. The $200,000 resulting from the sale of the new stock will be used for the payment of outstanding indebtedness and the purchase of new equipment.

MICHIGAN

Fire recently damaged the plant of the Lee & Porter Mfg. Co., Niles.

The King Saxton Clamp Co., Battle Creek, has been incorporated to manufacture clamps; $25,000.

The Liberty Mfg. Co., Detroit, has been incorporated to manufacture fire extinguishers; 10,000; by E. M. Robinson and H. L. Nelson.

The Brinker Rotary Gas Engine Co. has been organized at Centreville, with an authorized capital stock of $30,000.

The Moore Truck & Mfg. Co. has engaged in business at Wyandotte with an authorized capital of $15,000 common and $5,000 preferred stock.

The Detroit Edison Co., Detroit, announces in its annual report that it will build a new power plant in that city, the preliminary work to start at once.

Plants of the F. L. Jacobs Welding Co., the Acme Wire Fence Co. and the Coleman Mfg. Co. were damaged by fire in the building at 442 Guoin street, Detroit, recently.

The Jeffrey-Dewitt Co., Detroit, advises that it has completed additions to its plant, but does not expect to add any new equipment at this time.

Power and woodworking equipment will be purchased by C. L. Kelly, Grand Rapids, who has plans for the establishment of a large crating factory at Chattanooga, Tenn.

The Peter Smith Heater Co., Detroit, has merged its business into a stock company with a capital stock of $250,000 common and $250,000 preferred.

The Gorden Keenedge Co., Detroit, has engaged in the manufacture of

razor sharpening machines and other machinery. Its authorized capital stock is $30,000.

The Timken-David Brown Co., Detroit, has engaged in business for the manufacture of drive gears and worm wheels. Its authorized capital stock is $250,000.

The Saginaw Wood Products Co., Saginaw, has completed an addition, 48 x 100 feet, to its plant for the manufacture of broom handles, and is erecting a modernly equipped power plant, 50 x 100 feet.

The Lyons Machinery Co., Detroit, is planning to move to Muskegon. It has had plans prepared for a new $5,000 building at the lake port town. The company is capitalized at $70,000.

The Detroit Superior Foundries Corporation, of Detroit and Trenton, has filed articles of incorporation; capital stock, $30,000; by James Svhefer, W. T. Willard, Harry A. Peters, Ralph I. Wollis and J. W. Williams.

The Lake Superior Iron & Chemical Co. is considering further extensions to its plant at Manistique. These extensions would include the installation of a retort system of wood distillation and the erection of a saw mill at an approximate cost of $500,000.

James D. Wilson, former president and general manager of the Montague Iron Works Co., Montague, and Martin Hausler, South Chicago, Ill., have taken over the interests of the Montague Iron Works Co. and will continue the business along the same lines as in the past.

The Standard Brass Works, Detroit, is located in its new plant at 97-109 Wight street, and expects to double its capacity. It makes priming cups, drain cocks and brass castings for the auto trade. The officers of the company are: President, Fred G. Austin; vice president and treasurer, William A. Moran; secretary and general manager, H. R. Brownell.

The George C. Canright Co., Grand Rapids, has been incorporated to take over the business of George C. Canright & Co.; $8,000; the company has removed to 349 South Division avenue, and will enlarge its business of manufacturing gas and electric light fixtures. The officers are: President, George C. Canright; vice president, E. V. Canright; secretary-treasurer, O. T. Rumsey.

The Detroit, Belle Isle & Windsor Ferry Co., Detroit, is planning to add another large pleasure steamer to its fleet operating on Detroit river between this city and Windsor, Canada, and the several summer resorts between Lakes St. Clair and Erie. The new steamer, the contract for the construction of which may be let this spring, will be about the size and along the same line of the Britannia. The Britannia, which was built in 1906, is 164 feet in length, with three decks, and of steel construction.

MINNESOTA

The Gopher Heading & Mfg. Co. has been organized at Cook and will begin operations soon.

Daniel Hall, Alden, has bought the interest of his partner in the Hall & Mathiason Machinery Co.

The power plant of the New Ulm Electric Service Co. is to be enlarged and new machinery bought. The Oscar Claussen Engineering Co., St. Paul, has been preparing plans and specifications.

The Annapolis Public Utilities Co. will take steps at once to enlarge its plant and provide new boilers, power units and auxiliary equipment, as the result of an extensive franchise recently secured.

With the extension of the electric system of the Otter Tail Power Co., Fergus Falls, to Herman, Donnelly and Morris, Minn., now projected, additional machinery for the generating plant and sub-stations, including power and lighting transformers, will be required.

The Hugo Mfg. Co., Duluth, has been incorporated to manufacture machinery and tools; $50,000; by R. T. Hugo, N. F. Hugo, William Hawks, A. P. Cook and R. B. Knox.

The St. Louis Steel Foundry Co., Wellston, has been incorporated to manufacture and deal in steel and iron castings; $2,000; by J. H. Steedman, G. F. Steedman, E. H. Steedman, W. C. Hecker, J. P. Maloney and W. S. Morrison.

MISSOURI

The National Tube Co. has opened a new district office in Kansas City, at 420 R. A. Long building.

The Otis Elevator Co. has bought a site and building at Twenty-third and Locust streets, St. Louis, and is expected to secure plans at once for a factory.

The Christopher & Simpson Iron Works, St. Louis, has been awarded the contract for the steel to be used in constructing a 1,000-barrel flour mill for the Valler & Spies Milling Co., of St. Joseph. About 450 tons of steel will be required. Work on the new mill, which will be erected in Edwardsville, Ill., will be started within 30 days.

MONTANA

The Miles City Garage & Machine Co., Miles City, successors to the Miles City Auto Co., is adding machinery to its plant.

NEW JERSEY

The Bordentown Electric Co. will expend about $50,000 on improvements and extension to its plant and system.

J. W. Melick, Madison, has organized a company to build a hydro-electric plant near Morristown, on the Black river.

The National Fireproofing Co. is considering plans for establishing an electric-light plant in connection with its works at Port Murray.

Tests of a new electric automatic brake by the Westinghouse Electric & Mfg. Co. by the Pennsylvania railroad at Atlantic City have been declared successful.

The Premier Distributing Co., Orange, has been incorporated to manufacture all kinds of machinery; by Romie A. Effenbergen, Alfred Bitterle, Greggory Morrisey.

The Everett Co., Newark, advises that it expects to incorporate next month with a capitalization of $75,000, after which a modern factory will be built and molding machines installed.

The Holt Mfg. Co., Stockton, Cal., advises it has ordered practically all the machinery needed for its new plant to be erected in Newark Meadows for the manufacture of its line of traction and agricultural implements.

The International Harvester Co. of New Jersey, capitalized at $70,000,000, values its Wisconsin interest at $4,965,000, according to a statement filed in the office of the secretary of state. The company paid a fee of $4,965 for filing the articles to do business in Wisconsin as a foreign corporation. Burton C. Wait, of Milwaukee, is state representative. Until Jan. 1, last, he was general superintendent of the Milwaukee harvester works of the corporation, then being promoted to the management of the entire Wisconsin interest.

NEW YORK

Fire recently caused $25,000 damage to the buildings of the East Buffalo Iron Works.

The Syracuse Chilled Plow Co., Syracuse, has filed notice of its withdrawal from Indiana.

The Knox-Reiman Co., Williamsville, is building a planing mill on its property at Main and Walnut streets, that city.

The Equipment Improvement Co., New York City, has been incorporated to manufacture signalling devices and

run a general machine shop; $100,000; by Alexander Turner, Robert H. Weatherly and Frank H. Clark, 30 Church street, New York city.

The Enterprise Foundry, Auburn, was recently destroyed by fire. A. H. Nichols, manager, states that the plant will probably be rebuilt soon.

The Durno Mfg. Co., Rochester, to manufacture mechanical appliances for autos; $100,000; by John H. Durno, John F. Turk, Milton Noyes, of Rochester.

The Osborn Patented Machinery Co., New York City, has been incorporated; $250,000; by W. S. Osborn, 160 broadway, Andrew M. Osborn and Joseph Rubin.

The Otis Elevator Co. will build a new foundry at Buffalo. The contract for fabricated steel, 900 tons, has been awarded to the American Bridge Co.

The New York Central Railroad Co. has obtained a permit to construct a power and heating plant at Rochester, at a cost of approximately $25,000.

The Sweet & Doyle Co., Schenectady, has bought a plant on Center street, Green Island, from the Federal Signal Co., abandoned seven years ago after a fire.

Two buildings of the Thomas Hinds foundry at Malone, were damaged by fire recently. The foundry, machine shop and pattern building were involved.

The F. & H. Metal Mfg. Co., Syracuse, has been incorporated; $25,000; by Albert Feuerlich, Regina Feuerlich, Byron G. Harrington, Mary Harrington, all of Syracuse.

The Rochester Excavating Machine Co., Rochester, has been incorporated; $10,000; by John G. Fogarty, Henry C. Schroeder, Jennie E. Schroeder, of Rochester.

Ferguson Iron & Steel Co., Buffalo; to deal in iron and steel, etc.; $100,000; by James E. Ferguson, John W. Robinson, Charles Kennedy, all of Buffalo; these constitute the board of directors.

The Troy Nickel Works, Albany, whose plant was completely destroyed by fire last summer, has its new building completed and is at present installing the new equipment. All machinery was made special.

The Niagara Electric Steel Corporation, Buffalo, has been incorporated to manufacture steel castings and alloys; $50,000; by Leroy A. Lincoln, James N. Mandeville, Karl E. Wilhelm, 506 Ellicott square, Buffalo.

D. J. Renaud & Son have practically completed the construction of a new iron and brass foundry and machine shop at Carthage. The building, which is of concrete, is divided into three departments, for the general foundry, brass foundry, and machine shop. A 42-inch lathe and a large traveling crane are to be installed during the next two months.

Acer & Whedon, Medina, have been incorporated to manufacture sheet metal goods, etc.; $35,000; by Charles W. Whedon, 420 West avenue; Ella W. Acer, 223 West Center street; Oscar W. Acer, 503 Ohio street, all of Medina.

The Eden Specialties Corporation of Manhattan, New York City, has been incorporated to manufacture electrical devices; $25,000; by James R. Kissam, Bradford Darrach Jr.; Fred E. Hazard, 90 West street, New York City.

H. P. Engineering Works, New York City; has been incorporated to manufacture machinery; $5,000; by G. William Porter, Herman F. Marschner, both of 111 Manhattan street, New York City; James N. Hetcher, 311 Cornelia street, Brooklyn.

Schmidt Bros. Machine Works, New York City, has been incorporated to manufacture and deal in machinery; $15,000; by G. P. and Margaret C. Schmidt, 1327 Chisholm street, Bronx; Thomas A. Hill, 170 Broadway, New York City.

The Lake Shore Electric Light & Power Co., Inc., Westfield, is planning to establish a generating plant and distributing station in the vacinity of Westfield. The directors of the company are Eugene L. Falk and William M. Scott, of Buffalo, and L. J. Ottaway, Westfield.

The Niagara, Lockport & Ontario Power Co., Buffalo, which controls the Salmon River Power Co., Syracuse, has obtained authority for a large bond issue, the proceeds of which will be used to enlarge the latter company's system, involving the eventual purchase of considerable new equipment.

The Automatic Safety Gas Valve Co., New York City, has been incorporated, under the laws of New Jersey, to manufacture, buy, sell and deal in automatic safety gas valves; $3,000,000; by Gerald H. Gray, New York City; Clayton E. Bailey, Jamestown, N. Y.; Condit S. Atkinson, New Brunswick, N. J.

NORTH CAROLINA

The Eastman Mining Co., Sylvia, has been incorporated, $10,000, by Charles L. Martin, Philadelphia, E. B. McDade and Robert U. Garrett, of Sylvia. The company will mine lead and mica.

NORTH DAKOTA

The Minneapolis Steel & Machinery Co. is planning to establish a branch house at Bismarck, to handle business in that territory.

OHIO

The plant of the Christy Steel Co., Akron, was damaged recently by fire.

The Mather Spring Co., Toledo, has certified to an increase in capital from $100,000 to $300,000.

The Wheeling & Lake Erie railroad is contemplating moving its machine shops from Toledo to Brewster.

The King Machine Tool Co., Cincinnati, is having an extension built to its factory, which should be ready for occupancy in about six weeks.

The Fostoria Electric Co., Fostoria, has been incorporated to manufacture electrical supplies and incandescent lamps. Incorporators are Charles H. Graves, Frank Espey and James F. Loftus.

Harry Kake, Cincinnati architect, is making plans for a machine shop and foundry, 80 x 180 feet, of concrete, brick and steel, laid out to allow duplicate to be erected later.

The Simmerman Boiler & Tank Works, Dayton, located at the Big Four railroad and Irving street crossing, is building an addition 40 x 40 feet.

The Reeves Specialty Co., Hamilton, has been incorporated to manufacture household devices; $150,000; by W. W. Reeves, Frederick Shearer, J. T. Petree, John Sommer and R. F. Jones.

The Charles F. Stamp Co., Cleveland, manufacturer of steel plant equipment, recently secured an order for two five-ton electric traveling cranes from the Standard Steel Castings Co., Cleveland.

The Ice Delivery Co., Cincinnati, has let the contract for the Millcreek Valley branch to the Henry Vogt Machine Co. The contract for the Ft. Thomas plant has been let to the Madison Cooper Co., Calsen, N. Y.

The Dover Steel Co. is being incorporated to erect at Canal Dover an open-hearth steel plant; $1,200,000; by Albert P. Meyer, W. L. M. Parkin, Archibald Smith, H. C. Meyer; to have two 75-ton furnaces, a three-inch bar mill, six hot mills and other equipment.

The Brier Hill Steel Co., Youngstown, advises it has placed contracts for machinery for its new steel plant as follows: Coal-handling and crushing machinery, Heyl & Patterson, Pittsburgh; power house, switch board and electric locomotive for open-hearth plant, the General Electric Co., Schenectady, N. Y.; con-

troller equipment for cranes and other motors, the Westinghouse Electric Co., Pittsburgh.

The Toledo Machine & Tool Co., Toledo, has broken ground for an extension to its plant, 100 x 145 feet, three stories. It is expected to complete the work by July 1. A new power plant will be installed, for which new equipment has been ordered.

The Cleveland Railway Co., Cleveland, has placed an order with the Orenstein-Arthur Koppel Co., Pittsburgh, manufacturer of portable and industrial railroads and railway equipment, for 10 cars to be used in the transportation of construction materials.

The Brier Hill Steel Co., Youngstown, has concluded its crane purchases, for the present. The last of the long list of cranes was purchased a few days ago, when an order was placed for a 150-ton electric Morgan stripper, built by the Morgan Engineering Co., Alliance.

Plans are being made for the rebuilding of the Snider Mfg. Co., at Logan, which was destroyed by fire some time ago. The new plant will be twice the size of the old. The Logan city council has appointed a committee which has raised $6,000 to be applied to construction of the plant.

The Cleveland Galvanizing Works Co. is preparing to erect a new factory building at 3924 Cooper avenue, Cleveland. Plans call for a five-story brick, steel and reinforced concrete building, about 33 x 130 feet. The contract for this construction has been let to the George B. McMillan Co., which will start work at once.

The Marine Boiler Works Co., York street, Toledo, has just secured a contract from the Great Lakes Engineering Works, Detroit, which includes 12 Scotch marine boilers, 13 feet in diameter and 12 feet long. The boilers are to be used for the three car ferries for the Grand Rapids & Northwestern Railway Co. recently ordered.

The Bregwoodkro Stamping Mfg. Co., Lorain, advises that it has increased its capital to $50,000, and intends to build as soon as possible, when it will be in the market for punch presses, wood-turning machines, gas engines and other supplies used for stamping. The officers are: President, Harry Bregman; treasurer, Joseph Woodings; secretary, I. Krohn.

The Gas Machinery Co., Cleveland, constructor of gas plants, coke ovens, gas producers and muffle furnaces, is increasing its capital stock from $50,000 to $150,000. The company has found the added capitalization necessary to meet with the rapid growth of business and to provide for new road equipment and plant additions. The officers of the concern are: President, Pierre Plantinga; vice president, I. C. Hamlink; secretary, W. E. Steinwell; treasurer, Arthur M. Smith; assistant secretary, T. J. Crighton.

The Interstate Commerce Commission has again ruled on the ever-present and ever-troublesome question of reparation by dismissing the claim of the New Pittsburgh Coal Co. against the Hocking Valley railroad. The claim was for refund on shipments moving from the Hocking field in central Ohio to Toledo during 1910 and 1911, during which period the 90-cent rate was in effect. Inasmuch as that included 5 cents for transferring the coal and reloading it on ships, the commission has always treated it as an 85-cent rate.

PENNSYLVANIA

The American Sheet & Tin Plate Co. recently purchased a 30-ton and a 10-ton crane for the works at Vandergrift.

The Des Moines Bridge & Iron Co., Neville Island, has closed negotiations for a lathe and shaper for a new machine shop at that city.

The Carbon Steel Co., Pittsburgh, has put out an inquiry for a 20-ton magnet handling crane to be installed in the plant of that city.

The Treadwell Construction Co., Pittsburgh, recently purchased an electric grinder and buffer from the James Clark Jr. Electric Co., Louisville, Ky.

The Crucible Steel Co. of America, Pittsburgh, has opened negotiations for a 10-ton trolley for installation in the Crescent works of the company.

The Best Mfg. Co., Pittsburgh, has been awarded the power pipe contract for the new power station to be built by the New York Edison Co., at New York City.

Fire in the foundry of F. N. Peters & Bros., at Newside, recently did damage estimated at several hundred dollars.

The American Railway Appliance Co., Oil City, has been incorporated with a capital of $100,000; by D. E. Byles, Louis Schwartzkopf, Eugene Liebel, W. N. Maland.

The city clerk of Chester will receive bids up to 8 o'clock p. m. March 17, for reinforced concrete retaining walls along the Chester river.

The Hamburg Boiler Works, Hamburg, advises that it is planning to build an addition to its works, and that it is in the market for a 16-inch lathe.

The Hawley Down Draft Furnace Co., Easton, has been organized with a capital of $100,000; by F. C. Rockafellow, E. M. Rockafellow and R. W. Bowlby, Easton.

The Locomotive Stoker Co., Wilmerding, has been organized with a capital of $5,000; by Alexander Black, J. G. Buch and Miles H. England, Pittsburgh.

The Baldwin Locomotive Works has taken an order for 50 locomotives from the St. Louis & Southwestern railroad and will also furnish ten locomotives for shipment to Chili.

The Bryden Horse Shoe Co. is increasing its capital stock from $750,000 to $5,275,000. It is understood that none of the new stock will be issued for some time.

Irwin & Leighton, contractors, will erect a fire-proof machine shop for the Victor Talking Machine Co., at Front street, between Market and Cooper streets, Philadelphia.

The Berwind White Coal Co. has placed a contract with F. W. Richardson, Pittsburgh representative of the Ehret Magnesia Mfg. Co., Philadelphia, for pipe coverings for a power house at Houtzdale, Pa.

The Washington Coal & Coke Co., Dawson, has purchased 206 acres of coal in Jefferson township, Fayette county. The coal will be operated from the Star Junction plants of the Washington company.

The Erie Nipple Mfg. Co., Erie, is being incorporated to manufacture nipples from iron and steel pipe, and other plumbing supplies; by Charles A. Eaton, Henry W. Davis and Chas. C. Eaton.

The Robinson Ventilating Co., Pittsburgh, has been incorporated with a capital of $10,000; by J. R. Robinson, Mt. Lebanon; S. B. Robinson, Monongahela, and W. H. Thompson, McKeesport.

Seven vessels have been chartered to carry iron ore from Santiago, Cuba, to Philadelphia, part of a 1,500,000 order for the Bethlehem Steel Co. It will be carried by the United States Shipping Co.'s vessels.

The Carpenter Steel Co., Reading, has installed a telautograph for the transmission of messages and orders without loss of speed or liability to error. As the sender writes his message on the transmitting apparatus it is reproduced at the receiving end.

The Pennsylvania railroad has closed negotiations with the Ehret Magnesia Mfg. Co., Philadelphia, through F. W. Richardson, manager of the Pittsburgh branch, for cover-

ings for pipes at the new power plant at the Pitcairn, Pa., shops.

Employes of the Mt. Carmel Iron Works, Mt. Carmel, have closed a transaction with the principal stockholders whereby they have taken control of the company. The employes will operate the plant in the future as a co-operative company.

The Laughlin-Barney Machinery Co., Union Bank building, Pittsburgh, has been appointed exclusive sales agent in the Pittsburgh district for high duty drills and all types of single and multiple spindle machines manufactured by the Foote-Burt Co., Cleveland.

The McClintic-Marshall Construction Co. has made its final shipment of structural steel from Baltimore for the Panama canal, making over 60,000 tons of fabricated material supplied from the Rankin works. H. H. McClintic is in the canal zone, representing the company.

The American Pulley Co., Philadelphia, has awarded the contract for a large factory building to be erected at 4200 Wissahickon avenue, that city. The building will be two-stories and 181 x 151 feet, with a wing 50 x 80 feet. Joseph Bechtel is the general contractor.

The Hollis Automatic Traction Co., Knoxville, has been incorporated under the laws of Delaware to manufacture and sell motor vehicles and accessories; $250,000; by Otis A. Hollis, Knoxville, Pa.; J. H. Mering, Crafton, Pa.; Robert W. Egan, Pittsburgh.

The Jamison Coal & Coke Co., Pittsburgh, is electrifying all of its plants in the Greensburg field, substituting electricity for compressed air. Twelve or 15 locomotives, electrical mining machines, dynamos and generators have been purchased, and nearly all of the new equipment has been installed.

The Aluminum Co. of America has entered the market for nine cranes for installation in the Tennessee works, the New Kensington, Pa., works, and the plant at Mossena, New York. The inquiry includes the following cranes: One 90-ton; two 15-ton; three 5-ton; two 6-ton, and one 40-ton crane.

The Baldwin Locomotive Works will increase its working force by 30,000 men, according to an announcement made recently by President A. B. Johnson. Most of the additional force will be used in the Eddystone plant of the company, for the manufacture of the larger locomotives. The capacity of this plant will be increased to 3,000 engines a year—double its present capacity. The Philadelphia works will be used for the manufacture of electric and other smaller locomotives, the demand on the company for which has grown to be enormous.

The Pennsylvania Rubber Co., Jeannette, has closed negotiations for an 85-horsepower Economy steam condensing turbine, built by the Kerr Turbine Co., Wellsville, N. Y., and one 6-inch Wilson-Snyder centrifugal pump, built by the Wilson-Snyder Centrifugal Pump Co., Pittsburgh, to deliver 1,000 gallons per minute against a total head of 220 feet.

William Swindell & Bros., engineers and contractors, 5035 Jenkins Arcades building, Pittsburgh, have been awarded the contract for the building of the open hearth and heating furnaces and the gas producer plant for the Alton Steel Co., Alton, Ill. There will be two 40-ton open hearth steel furnaces, work on which will begin as soon as possible. This company also has been awarded a contract for a 25-ton open hearth steel furnace for the Union Steel Casting Co., Pittsburgh.

TENNESSEE

The Iron City Stove & Foundry Co., Nashville, has been incorporated; $15,000; stoves and other foundry products will be manufactured.

The bridge committee of the county court at Lebanon will let a contract March 8 for the construction of two reinforced concrete bridges in that county.

The Sudekum Packing & Mfg. Co., Nashville, will equip a plant for the manufacture of metallic packing. The company is capitalized at $50,000. John M. Gray Jr. and Harry Sudekum are interested.

The Commercial Trust & Savings Bank, Memphis, has announced that it will erect a 22-story building to cost $1,000,000. It will be located at Main street and Union avenue. Work will start in September. An architect is to be appointed at once, according to President Goodman.

Reorganization of the Knoxville smelting & Refining Co., Knoxville, under the name of the Knoxville Smelting Co., capital $150,000, has been accomplished by the Appalachian Development Co., which will use the plant to test ores from the region being developed by the latter. Negotiations are under way for a site for a commercial smelter of 30 to 50 tons daily capacity. T. McMurry is president.

The Chattanooga & Tennessee River Power Co., Chattanooga, will begin at once the construction of a large steam power plant to be operated in connection with the large water power plant now being constructed at Hale's Bar, 15 miles from that city, where a dam is being built across the Tennessee river. This announcement was recently made by C. E. James, nominal head of the power company and representative of A. N. Brady, New York.

The Tennessee Timber, Coal & Iron Co., Chattanooga, recently placed an order with the Wheland Co., Chattanooga, for additional equipment necessary to convert its present band saw mill into a double mill.

The Lewisburg Foundry Co., Lewisburg, has been organized with a capital stock of $50,000, $20,000 of which was subscribed by citizens of Lewisburg. A charter has been secured and directors elected. The equipment of the Sheffield Cast Iron Pipe & Foundry Co., Sheffield, Ala., is to be moved to Lewisburg and a large plant erected. W. T. Archer, former general manager of the company at Sheffield, will serve in that capacity for the Lewisburg company.

TEXAS

Fire recently damaged the plant of the Meyers-Spalti Mfg. Co., Houston.

The Marshall Car Wheel & Foundry Co.'s plant, Marshall, has been reopened after a long shutdown.

H. A. O'Neill, Atlanta, owner of ore lands, has stated that he will build a $200,000 ore washer and concentrating plant near Atlanta.

Tennison Bros., Houston, makers of sheet iron products, have increased their capital from $100,000 to $150,000. Enlargement of the plant is contemplated.

Proposals will be received by John D. Kelley, city secretary, Galveston, until noon, Feb. 20, for delivery f. o. b. Galveston, of 13,000 feet lead cable, steel armored, guaranteed for 10,000 volt service.

The Durham Hosiery Mills, Durham, will demolish its No. 2 building and on the site erect two others, a main structure, 100 x 200 feet, and another, 40 x 80 feet, with boiler room. Equipment will be installed doubling the present capacity.

UTAH

The Utah Junk Co., Salt Lake City, Nathan and Simon Rosenblatt, managers, is planning to erect a rolling mill to make sheets. Nathan Rosenblatt expects to go east in about a month to buy equipment.

The Corlew Milling & Elevator Co., Snowville, was recently organized and is planning to build a mill, elevator, and electric light plant. J. J. Larkin is president, C. E. Eisenberg vice president, Thomas Rowe secretary, and J. C. Cutler treasurer.

WASHINGTON

The Odessa Hardware & Implement Co., Odessa, suffered a loss of $10,000 by fire that destroyed the Mercantile block.

The Phillips-Gordon Co., Spokane, has been incorporated to manufacture steam engines; $250,000; by William T. Phillips, E. B. Gordon and G. H. Lovejoy.

The Bellingham Iron & Steel Foundry, Bellingham, has been organized to take over the plant of the Bellingham Foundry Co.; $8,000; by R. E. Runkle, L. M. Runkle and others.

WEST VIRGINIA

The Jarvis-Huntington Automobile Co., Huntington, to manufacture and sell automobiles and auto trucks; $100,000; by F. C. Fifer, of Huntington.

Electrically operated mining machinery will be purchased by the Francois Coal & Coke Co., Clarksburg. C. E. Gocke is manager. The company has $100,000 capital stock.

The United Appliance Co., Huntington, has been incorporated to manufacture appliances and machinery; $150,000; by M. P. Wiswell, John S. Sheppard, M. A. Simms, G. A. Koontz and G. Growder, all of Huntington.

WISCONSIN

The Frost Engine Co., Evansville, has purchased land covering nearly a city block.

The Austin-Western Road Machinery Co., an Illinois corporation, has filed a statement to do business in Wisconsin.

Demolition of the old Merrill & Houston Iron Works, at Beloit, has been started to make room for a new plant. The plant is nearly 50 years old.

The machinery for the West Bend Equipment Co., West Bend, has been received and is being installed. The company is to make stanchions and litter carriers.

The Minneapolis, St. Paul & Sault Ste. Marie Railway Co. advises that reports of a contemplated roundhouse at Ashland are unfounded, and that the company is not figuring on any work at that place this year.

The Globe Foundry & Machine Co., Sheboygan, has reorganized, following a change in ownership of part of its stock. Officers elected are: President, Jacob Hilpertshauser; vice president, William Hilpertshauser; secretary, Arthur Miller; treasurer, Ervin Thiel. The new officers are purchasers of the interest of Paul Klumb.

The Feilbach Motor Co., Milwaukee, manufacturing motorcycles, with headquarters and works at 1148-1160 Holton street, has purchased a tract of five and one-half acres of factory site on Keefe avenue, between Booth and North Pierce streets, and is having plans prepared for a group of factory buildings to cost approximately $50,000.

The Kissel Motor Car Co., Hartford, has received an order from the postoffice department for five Kissel-Kar delivery cars of 1,500 pounds capacity, to be placed in the parcels post service out of the Washington (D. C.) postoffice. The cars are being built in the main works at Hartford.

Due to the cessation of operations of the big plant of the Wisconsin Engine Co., Corliss, which recently was thrown into financial litigation by bondholders, the manufacture of the "Orchard Tractor," a recent acquisition of the M. Rumely Co., of LaPorte, Ind., has been transferred to the LaPorte works of the Rumely company. The California branch works of the Rumely company is also engaged in Orchard tractor production, which will be increased in volume at once.

The Gurney Refrigerator Co., Fond Du Lac, has been reorganized, following the retirement of C. J. Medberry, president and general manager. The company is owned principally by Mrs. Ben Hooper and Mrs. David Jack. E. G. Vail, Chicago, sales manager of Fairbanks, Morse & Co., has been elected general manager, and H. O. Winkler, president of the W. N. Durant Co., Milwaukee, secretary. No immediate improvements or extensions are planned, but the volume of business now being done makes the expansion probable within the coming year.

The Lewis Motor & Engineering Co. is being organized by Ralph C. Lewis, until now general manager of the Beaver Mfg. Co., of Milwaukee, which is allied with the Filer & Stowell interests, with the purpose of establishing a plant for the production of automobile motors. The Beaver company manufactures motors for the automobile and truck trade. Mr. Lewis has designed several gasoline motors of the monobloc type, incorporating several important features of European motor practice, which will be offered to the manufacturers of pleasure and commercial cars in this country.

The Fairbanks-Morse Mfg. Co. will make additions and improvements to its Eclipse works at Beloit, which will add 43 per cent to the total floor space. Options have been taken on considerable acreage adjoining the company's present large holdings, and it is stated that the plans include the erection of a five-story manufacturing building embracing 21 acres of floor space. It is said, also, that several stories will be added to some of the present buildings, which were originally erected with this in view. The Fairbanks-Morse Eclipse works form the largest industrial unit in the city of Beloit.

Workmen have completed one of the five sections of the new steel approach to the Great Northern ore docks at Allouez, and everything indicates that the entire contract will be finished by the time navigation opens in the spring. Other construction is progressing well. The distribution of the steel and ties to be used in rebuilding the main line to Duluth and Superior is practically completed. It is proposed to begin actual work of rebuilding at once. Sixty miles of line from Boylston to Hinckley will be rebuilt with 90-pound steel, supplanting the 75-pound rail now used.

The entire charcoal output of the Cliffs Chemical Co., Goodman, Marinette county, which commenced the operation of its new works in connection with the Goodman Lumber Co.'s large mills at Goodman, a short time ago, is being shipped to Gladstone, Mich., for use in the furnaces of the Cleveland-Cliffs Iron Co. The additional supply has made it possible to operate the furnaces on a more extensive scale and insures a continuity of operation. The capacity of the chemical plant at Goodman is about one-fifth of that of the Pioneer Iron Co.'s chemical plant at Marquette, owned by the Cleveland-Cliffs Iron Co.

The Industrial Association of La Crosse, has agreed to the proposition made by the National Gauge & Register Co., of La Crosse, to provide a suitable building for its works, and the company will remain in La Crosse. The National concern, which manufactures gauges and registers for tanks, containers, etc., was established about six months ago, and since that time has been occupying temporary quarters. It has several large contracts with automobile manufacturers on its books and has been obliged to turn down orders because of insufficiency of producing facilities. The Industrial club will erect a $25,000 factory building, to be leased for a long term of years by the gage company.

WYOMING

Loss of $5,000 was caused recently by fire in the "Made in Cheyenne" exhibit room prepared by Cheyenne manufacturers.

CANADA

ALBERTA

The Dominion Clay Products Co. will build a plant in Dunmore at a cost of $100,000, on a site purchased from the Dunmore Development Co. A Mr. Daley, of Terre Haute, Ind., made the purchase, and will probably be the president of the Canadian company.

The Dominion Bridge Co., Ltd., has completed the erection of 730 tons of structural steel for the new Lancaster block which is being built at Calgary, at a cost of $450,000. The Herald Publishing Co., Ltd., also has under erection in Calgary a 10-story reinforced concrete building. The Corrugated Bar Co., of St. Louis, Mo., is the consulting engineer and is supplying the steel for reinforcing.

BRITISH COLUMBIA

Plans will be received by the town board of Edmonds, until March 3, for 15 miles of steel water pipe from 3 to 10 inches in diameter.

Lighting and heating equipment and refrigerating machinery will be required for the 10-story Hudson Bay Co.'s new store at Vancouver, the contract for which has been let to Rourke, McDonald, & Moncrieff, Vancouver.

The British Columbia Electric Railway Co., Vancouver, has contracted with the Western Canada Power Co. for 1,200 horsepower on Sept. 1 next, to be increased to 40,000 horsepower on the completion of the power company's second installment.

Construction of the Granby Bay smelter is nearing completion, and the plant will be ready to commence operations in May or June. Development at Hidden Creek has progressed to a point that insures ore for a number of months in advance of the smelter's needs. The Granby Smelting Co. has a capital of $1,500,000, and its earnings average $150,000 a month. The directors have called a meeting for this month to arrange for a bond issue, and to insure its flotation in an emergency.

A machine shop, marine slip, offices and other buildings will be built on the Fraser river by the Pacific Dredging Co., Vancouver. In view of the commercial stimulus which will be caused by the opening of the Panama canal, the company has decided to establish a dredging plant on the Pacific coast, costing in the neighborhood of $500,000. Besides its present fleet of dredges, the company will build a 110-ton seven-yard dipper dredge, and plans have been prepared for another of the hydraulic type. The work on the plant will commence in the summer. At a later date, the company will install a full line of tugs for towing on the Fraser river. J. L. Davidson is the president of the concern.

MANITOBA

The business of the Winnipeg Tool & Forging Co. has been purchased by Luther Holling, recently a tool expert in the Winnipeg shops of the Canadian Pacific railway, who will begin the manufacture of some new lines of goods.

Tenders will be received at the office of the Winnipeg Public School board up to March 6 for electrical machinery, tools and equipment for the Kelvin and St. John's technical high schools. J. B. Mitchell is commissioner of supplies.

Details in regard to the construction of the bridge which will be built over the Red river by the town of St. Boniface show that it will cost $600,000, will be 930 feet long, of seven spans consisting of two abutments and six piers. Navigation facilities will be provided in a Strauss bascule lift span. The bridge is to be of the half through girder type, and will be built under the supervision of M. P. Blair, city engineer of St. Boniface.

During the month ended Feb. 11, the following rolling stock was received by the Grand Trunk railway: 16 Pacific type locomotives with 69-inch wheels from the Montreal Locomotive Works; eight Mikado type locomotives with 27 x 30-inch cylinders from the American Locomotive Works; three switch engines with 20 x 26-inch cylinders from the Canadian Locomotive Works; 298 box cars from the Canadian Car & Foundry Co., Turcot, Que.; eight refrigerator cars from the Canadian car & Foundry Co., Amherst, N. S.; 764 box cars from the Pressed Steel Car Co., McKees Rocks, Pa.; nine tank cars from the Mathers Stock Car Co.

NEW BRUNSWICK

The Dominion Steel Corporation has decided not to rebuild its sawmill at Dalhousie at the present time.

The Noyes Machine Co., Portland, Me., advises that no new machinery will be required for its new Canadian branch at St. John, as machinery from the Portland plant has been installed.

The New Brunswick Coal, Iron & Clay Co., Ltd., with a capital of $275,000 will apply for incorporation in New Brunswick to develop clay deposits, erect mills, and to carry on general mining. Messrs. Inches and Hazen of St. John are among the incorporators.

New machine shops will shortly be built by the Canadian Pacific railway at McAdam Junction, to replace the present plant, which is insufficient to cope with the increased business. Tenders for a concrete building will shortly be called for.

Tenders are being called for the erection of a power plant for the sanitorium at River Glade, near Sackville, which will require equipment for a small incinerator, boiler house and engine and dynamo room. At present only one dynamo and boiler will be installed, but plans will allow for expansion. Architect F. N. Brodie is calling for the tenders.

Chief Commissioner Morrisey, of the New Brunswick government, has awarded the contract for the superstructure of the new arch bridge to replace the present suspension bridge at St. John, to the Dominion Bridge Co., of Montreal. The superstructure will cost about $275,000. According to the terms of the contract, the bridge is to be completed and ready for use by June 1, 1914.

The following rolling stock is now being delivered to the Intercolonial railway, orders for which were placed last year: One thousand three hundred and seventy-three steel frame box cars, 300 wooden box cars, 200 steel underframe flat cars, 50 Hart-Otis coal cars, 50 Hart-Otis dump cars, 100 Hart-Otis convertible cars, 35 refrigerator cars, 20 steel underframe stock cars, one tank car, 20 consolidation freight engines and eight switching engines.

T. McAvity & Sons, St. John, will assemble and greatly enlarge their present large brass and iron manufacturing industry in that city. They will build a new plant on land which the city will reclaim by erecting a seawall enclosing about 40 acres at the southernmost part of the city proper. The buildings to be erected are as follows: Malleable iron foundry, including flask shed, union shops and core room; iron molding shop including emery wheel grinding room, tumbling and cleaning, coal and pig iron, flask and sand sheds and pattern vault; brass pattern vault, brass pattern shop, drafting room, lumber sheds and eating room, all in one group; building for hydrants and standpipes, lamp posts, etc.; soil pipe warehouse; brass finishing shop, monitor room, brass molding shop and flask sheds, polishing, plating, assembling rooms and warehouse; machine shops, testing room, construction room, pipe sheds, pipe shops for

cutting and threading, pipe bending and welding shops, blacksmith shop and power plant; main office, warehouses and stables. Two of the buildings will be 600 feet long. The industry, when completed, will employ 2,000 hands and will pay in wages upwards of half a million dollars. It will have shipping facilities on the Intercolonial railway right at the plant.

NOVA SCOTIA

The town of Sydney has carried a by-law for a waterworks system to cost $75,000.

Equipment for smoke house, power house and refrigeration department will be required by the North Atlantic Fisheries Co., Port Hawkesbury, which was burned down last week. Arthur Boutilier, of Halifax, is the president of the company.

The Dominion Steel Corporation, Sydney, is enlarging its nail plant. The company's wire mill is equipped not only to provide wire for the nail mill and galvanizing plant, but wire for sale as well, including that already drawn to be made into nails. The new annealing department to supply that part of the nail market is rapidly being pushed forward to completion.

ONTARIO

The Canadian Car & Foundry Co., Fort William, has orders on its books totaling $45,000,000, enough to keep it busy until next September.

The capacity of the Seaman-Kent plant at Fort William will be doubled this spring, four additional kilns being required. J. E. Ockley is manager.

Plans for a waterworks system to cost $111,000 and a sewerage system to cost $39,000 will be received by Clerk John Lyle, of the Bowmanville council, until March 19.

The majority of the ratepayers of Strathroy have voted in favor of loaning $25,000 to the Royal Motor Co., to enable it to start operations. The firm will employ 200 men ultimately.

The B. F. Kastner Co., Stratford, will erect a $15,000 plant for the manufacture of leather mitts and gloves if the town will make certain concessions.

A water supply pipe about 65 miles in length will probably be built from Thirty-one-Mile lake, in the Gatineau district of Quebec, to supply the city of Ottawa with water.

A wharf and the initial unit of a freight shed system, costing half a million dollars, will be constructed at Fort William by the Richelieu & Ontario Navigation Co.

The Ottawa municipal electric plant will be changed this year from a three-phase to a two-phase plant, for which purpose a reinforced concrete storehouse at a cost of $16,000 will be built and alterations in equipment made.

A large piece of land has been purchased by the Imperial Oil Co., of Sarnia, on which it will build a factory to manufacture Rayo lamps and oil stoves. Nearly two hundred men will be employed.

Tenders will be called shortly for a concrete bridge, for the Township of York, 65 feet in length, with 14 feet roadway, costing about $6,000. For particulars, apply to Frank Barber, town engineer, York Mills, Ont.

The Canada Car & Foundry Co., Fort William, is said to have received an order for 1,000 cars from E. J. Chamberlin, president of the Grand Trunk Pacific railway. The cars are to be ready for the end of the year.

The Toronto Electric Light Co. will shortly increase the number of its lines from Niagara Falls to Toronto from one to four. It is the company's intention to change the current from alternating to direct.

The Ontario Yarn Co., Markham, will rebuild the plant recently partially destroyed by fire. The company will spend $40,000 on new buildings if the town will lend $20,000, and will spend $8,000 on additional machanery.

The Western Terminal Elevator Co. will increase the capacity of its elevator at Fort William. A million bushel annex will be added during the summer at a cost of $400,000, according to an announcement recently made by Alex. Reid, of that company.

The large standpipe recently constructed at Berlin was filled recently for the first time. The tank has a capacity of 500,000 gallons. The entire structure cost $35,000, and is 125 feet high. It was erected to increase the water pressure for fire protection.

The Fort William Commercial Chambers, Ltd., has given a contract for the erection of the Fort William Grain exchange building to A. C. Stewart, of that city. It will be five stories in height with a frontage of 100 feet on Victoria avenue and 125 feet on Syndicate avenue, of reinforced concrete construction, to cost $280,000.

The appropriations for the work to be carried out on the eastern lines of the Canadian Pacific railway during the coming season have just been approved by President Sir Thomas Shaughnessy, and involve the expenditure of approximately $16,000,000. The main line from Islington to Guelph Junction on the London sub-division will be double-tracked for a distance of 30 miles, while other sections will also be double-tracked.

Second reading has been given by the Dominion parliament to a bill authorizing an increase of $5,000,000 capitalization in the Richelieu & Ontario Navigation Co. Sir Rodolphe Forget, president of the company, informed parliament that it was proposed to spend half a million dollars on vessel terminals at Fort William.

The J. B. Armstrong Mfg. Co., Guelph, manufacturer of carriages, has gone into voluntary liquidation. An order was obtained from the court by the Dominion bank, creditors for $64,694. The business was incorporated in 1912, and for a number of years has been operated at a loss.

Dominion Manufacturers, Ltd., Toronto, has been incorporated with $3,000,000 capital to carry on the business of manufacturer of and dealers in caskets, coaches and carriages, automobile body builders, hardware plate and plated goods, etc. H. J. Elliott, K. C., L. A. David and L. J. M. Dugas, Montreal, incorporators.

The following companies have been incorporated: Richards-Wilcox Canadian Co., Ltd., London, Ont.; capital, $70,000; to manufacture builders' hardware, provisional directors, Wm. R. Yendall, William A. Fitch and Lee E. Mighell; Masterton Wrench Co., Ltd., Toronto; capital, $45,000; to manufacture hardware and metal goods; provisional directors, Robert McKay, Gibson Grant and George A. Urquhart, and Reynolds Products Co., Ltd., Toronto; capital, $40,000; to manufacture steam and electrical appliances and machinery; provisional directors, Gideon Grant, David I. Grant and Bruce Williams.

The organization of the Owen Sound Rolling Mills Co. was completed Feb. 17, by the election of permanent officials, J. J. Drew being elected president; G. B. Ryan, vice president and A. H. Macdonald, secretary-treasurer. The executive offices will be located at Guelph, and the mills at Owen Sound. The work of construction will be pushed as rapidly as possible.

The Canada Forge Co., Ltd., Welland, advises under date of Feb. 17, that it is hurrying to completion a temporary building to replace the one recently burned and will have a part of its forge department operating within a week. Through expediting its work to such a degree the company will be able to satisfactorily care for the delivery requirements of their customers. This building will be covered within 90 days by a modern fireproof steel

construction forge shop of the most advanced type, the contract for which has been placed with the Standard Steel Construction Co., and especially designed for the manufacture of forgings up to 40,000 pounds each. The general dimensions will be 100 x 200 feet, with center bay equipped with 20-ton electric crane, 60-foot span, with two bays, each to be served with 5-ton electric crane, 20-foot span. At the end of this building and continuing 100 feet there will be constructed a 60-foot span electric crane runway, 20-ton capacity, for handling raw materials and shipping. This will not only insure the company against further interruptions in its production, but will greatly increase the scope of its work, and, equipped as it will be with steam hammers, hydraulic forging presses, annealing and heat treating furnaces, it will be one of the best forge shops on the continent.

QUEBEC

The contract for a new warehouse and office for the Canadian Fairbanks-Morse Co., Ltd., at Montreal, has ben awarded to E. G. M. Cape, of Montreal.

A reduction in the freight rates on wire fencing from Montreal westward has been made by the Canadian railway commission. They have been reduced to the level of the rates eastward to Montreal.

On account of the fear of the contractors that it would not be possible to get the required structural steel in time, none of the tenders recently opened on the construction of the Fort William Commercial Chambers, Ltd., grain exchange building, at Fort William, was accepted.

The Sales Co. of Canada, Ltd., Montreal, has been incorporated at Ottawa with $50,000 capital to manufacture and deal in vacuum cleaners and supplies, tools, equipment, etc., in connection therewith. W. R. L. Shanks, F. G. Bush, H. W. Jackson, G. R. Drennan and M. J. O'Brien, Montreal, incorporators.

The Cedar Rapids Hydraulic Co., Ormstown, has placed an order with the General Electric Co., of Schenectady, N. Y., for machinery to the value of $1,000,000, including twelve 10,000-kilowatt turbine generators of special make and design, which will be installed in the new plant at Cedar Rapids on the St. Lawrence river.

The city of Montreal has awarded to the John McDougall Caledonian Iron Works Co., Ltd., of Montreal, the contract for two 12,000,000 imperial gallon pumping units at a price of $50,046. More boilers will be purchased by the Montreal board of control for the low level pumping station and an electric pump for the high level station.

George T. Davis & Sons have been awarded a contract to build, at their ship yards in Levis, six steel scows for the public works department of Canada, and are completing a large steel screw dredge for the marine department.

The new roundhouse which is being constructed for the Grand Trunk railway at St. Lambert is rapidly approaching completion and will furnish accommodation for housing and repairing 27 locomotives of the largest type. The structure, which comprises roundhouse, machine shop, boiler house, fan house, office and stores, castings store and sundry accessories, is constructed of concrete, steel, brick and timber. There are many incidental appliances auxiliary to the roundhouse, some of which are quite new in design. The St. Lambert freight yards when completed will be among the largest of the system and will accommodate 2,100 cars.

Webster & Sons, Ltd., Montreal, have been incorporated with $100,000 capital to carry on the business of dealers in and manufacturers of tools, implements, machinery, foundry supplies, engines, as well as brick, tile, pottery, etc. G. M. Webster, merchant; J. W. Blair and C. A. Hale, advocates; F. J. Laverty, K. C., and J. Trudel, all of Montreal, incorporators.

The Dominion Chain Co., Montreal, has been incorporated at Ottawa with $50,000 capital to manufacture and deal in all kinds of weldless and welded chains of steel and other metals, hardware, parts and accessories for aeroplanes, automobiles, motor boats, etc. The incorporators are W. R. L. Shanks, F. G. Bush, G. R. Drennan, M. J. O'Brien and H. W. Jackson, all of Montreal.

Included in the official program of construction of the Grand Trunk Pacific railway for 1913, which has just been made public, are the following items: The gap between the eastern and western heads of steel in British Columbia, a distance of 426 miles, will be closed, rails will be laid into the towns of Branton, Moose Jaw, Weyburn, Battleford and Calgary, and several other important extensions will be undertaken; a steel structure across the Shuswap river in Manitoba will be placed in position; several steel bridges will be erected between Prince Rupert and Aldemere, B. C., and over Bow river and Elbow river, in Alberta.

The revised design of the Quebec bridge to be built over the St. Lawrence river provides for a main span of 1,800 feet in length. The top chord members of the cantilevers will consist of double lines of 16-inch bars, while the bottom chords will have the enormous dimensions of 7 feet height by 10 feet width. The length from panel point to panel point will be 86 feet; each full panel of the bottom chord for one truss will weigh 200 tons. Each cast iron base for the towers will weigh 500 tons, while the stringers from one panel point to another are massive plate girders 10 feet in depth and each weighing 60 tons.

SASKATCHEWAN

The J. I. Case Co. has secured a site, 220 x 300 feet, for the erection of a wholesale distributing warehouse at Yorkton.

The town of Weyburn will spend $220,000 during the year 1913 on sewerage and waterworks extensions, and for street paving. An extension will also be made to the electric light plant.

The city commissioners of Moose Jaw will receive tenders up to March 5 for line supplies including copper and iron wire. Specifications and information may be obtained from J. D. Peters, electrical superintendent.

Tenders for the supply of labor and material to complete all work will be received by T. Martin, divisional engineer for the Canadian Pacific railway, at Moose Jaw, for a boiler and machine shop at Wilkie.

A flour mill with a capacity of 1,000 barrels will be erected at Saskatoon this summer by the Northland Milling Co., of Larimore, N. D., as well as a large elevator and a flour house. C. H. Nohr, of Minneapolis, has the building contract.

The secretary-treasurer of the town of North Battleford will receive tenders until April 15 for furnishing cast iron and steel water pipes and specials, fire hydrants and gate valves. Plans and specifications may be seen at the engineer's office, Chipman & Power, Toronto and Winnipeg. H. W. Dixon, secretary-treasurer, North Battleford.

Tenders will be received up to March 17 by George D. Mackie, town engineer of Swift Current, for the supply of the following cast iron pipe: 8,566 feet of 6-inch; 2,230 feet of 8-inch; 3,346 feet of 10-inch; 6,214 feet of 12-inch; also 7 tons, or about 100 pieces of cast iron pipe specials. Tenders will also be received for 37 6-inch, 3 8-inch, 3 10-inch and 3 12-inch valves and boxes, and 22 6-inch fire hydrants.